

# 4510/4610

## Skid Loader

**SL4510 GASOLINE**  
**SL4610 DIESEL**



# OPERATOR'S MANUAL

**GEHL®**

# Warranty

## **GEHL COMPANY New Loader Equipment (Skid Loader and Attachments)**

**GEHL** Company (Inc.), hereinafter referred to as **GEHL**, warrants new **GEHL** machinery and attachments (the "Equipment") to be free from defects in material and workmanship at the time of delivery to the original purchaser if properly set up and operated in accordance with the recommendations set forth in **GEHL**'s Operator's Manual.

**GEHL**'s liability for any defect shall be limited to repair or replacement of the Equipment. **GEHL**'s obligation shall terminate twelve (12) months/or 1000 hours after the delivery of the goods to the original user or when the Equipment is first put into use, whichever combination of events occurs first.

This warranty shall not apply to tires which are subject to the warranty of the tire manufacturer. Please contact your **GEHL** dealer for further information on tire warranties.

This warranty shall not apply to any item of Equipment which shall have been repaired or altered outside the **GEHL** factory or authorized **GEHL** dealership or which has been subject to misuse, negligence or accident; neither shall it apply to Equipment which has not been operated in accordance with **GEHL**'s printed instructions or has been operated beyond the Company's recommended machine rated capacity.

### **EXCLUSION OF WARRANTIES**

Except as otherwise expressly stated herein, **GEHL** makes no representation or warranty of any kind, express or implied, including merchantability or fitness for a particular purpose in respect to the Equipment. **GEHL** shall not be liable for incidental or consequential damages for any breach of warranty, including but not limited to inconvenience, rental or replacement equipment, loss of profits or other commercial loss.

No agent, employee or representative of **GEHL** has any authority to bind **GEHL** to any affirmation, representation or warranty concerning its machinery and attachments except as specifically set forth herein.

Certain limitations expressed herein are excludable in accordance with provisions of local law. Such provisions shall be deemed struck if such local law is applicable. All other provisions shall continue to apply.

# TABLE OF CONTENTS

Chapter	Description	Page
	Warranty .....	Inside Front Cover
1	Introduction .....	2
2	Specifications .....	3-4
3	Check Lists .....	5-7
4	Safety .....	8-9
5	Controls & Safety Equipment .....	10-14
6	Operation .....	15-22
7	Adjustments .....	23-27
	International Symbols Explanation.....	28
8	Lubrication .....	29-31
9	Set-up & Assembly .....	32-36
10	Optional Features & Accessories .....	37-39
11	Decal Locations .....	39-41
12	Troubleshooting .....	42-47
13	Service .....	48-57
14	Maintenance Log .....	58-60
	Index .....	61-62
	Technical Publication Order Form .....	63-64
	Standard Hardware Specifications .....	Inside Back Cover

# CHAPTER 1

## INTRODUCTION

### Mr. Operator:

Your decision to purchase this piece of GEHL equipment was a good one. We are sure that your decision was strongly considered and that you are looking forward to many seasons of work from this machine.

We, as a Company, have invested a great deal of time and effort in developing our lines of agricultural and industrial equipment. The equipment you have purchased is built with a great deal of pride and designed to give you long life, efficient operation, durability and dependability.

This manual was developed specifically for the machine you have purchased. The information, contained within, was prepared for your assistance in preparing, adjusting, maintaining and servicing your machine. More importantly, this manual provides an operating plan for safe and proper use of your machine. Major points of safe operation are detailed in the **SAFETY** chapter of this manual. Refer to the Table of Contents for an outline (by chapters) of this manual. Use the Index, in the back of the manual, for specific chapter and topic/page number references.

**Modern machinery has become more sophisticated and, with that in mind, GEHL Company asks that you read and understand the contents of this manual COMPLETELY and become familiar with your new machine, BEFORE attempting to operate it.**

Our wide Dealership network stands by to provide you with any assistance you may require, including genuine GEHL service parts. All parts should be obtained from or ordered through your GEHL Dealer. Give complete information about the part as well as the model number and the serial number of your machine. Record numbers, in space provided, as a handy record for quick reference.

### Typical Model & Serial No. Plate

MODEL NO. <b>SL</b> (Fill In)
SERIAL NO.  (Fill In)
<b>GEHL COMPANY</b> <b>WEST BEND, WIS. 53095 U.S.A.</b>

The model number and serial number for this unit are on a decal located inside the Right Chassis Riser, between the Lift Arm and Lift Cylinder.

"Right" and "Left" are determined from a position sitting on the Seat and facing forward. From this position the Propulsion Control T-bar is on the "left" and the Lift/Tilt Control T-bar is on the "right".

GEHL Company reserves the right to make changes or improvements in the design or construction of any part without incurring the obligation to install such changes on any unit previously delivered.

Standard hardware torques appear in a chart at the end of the manual.

Throughout this manual, information is provided which is set in **bold type** and introduced by the word **NOTE. BE SURE** to read carefully and comply with the message or directive given. Following this information will improve your operating or maintenance efficiency, help you to avoid costly breakdown or unnecessary damage and, extend your machine's life. For your added convenience, an order form is provided at the end of this manual which can be used to conveniently requisition copies of this and other related Technical Publications.

**The GEHL Company, in compliance with the Farm and Industrial Equipment Institute and the American Society of Agricultural Engineers, has adopted this SAFETY ALERT SYMBOL**



**to pinpoint characteristics which, if not properly followed, can create a safety hazard. When you see this symbol in this manual or on the unit itself, you are reminded to BE ALERT! Your Safety is involved.**



# CHAPTER 2

## SPECIFICATIONS

**All Dimensions are in Inches (Millimeters)  
Unless Otherwise Noted**

Model & Description ..... SL4510 (Gasoline) &  
SL4610 (Diesel) Skid Loaders  
Engines ..... **4510** Ford 98 CID (1.6 liter) Industrial,  
Gasoline, SAE 40 hp (29.8 kw) @ 3000 RPM  
with 73.3 ft-lb (101.3 N-m) Torque @ 1900 RPM  
**4610** Perkins 108 CID (1.7 liter) Diesel,  
SAE 44 hp (32.7 kw) @ 3000 RPM  
with 85 ft-lb (117.6 N-m) Torque @ 1900 RPM  
Electrical System Characteristics ..... 12 volt D.C.  
Wet Cell Battery, 12 volt D.C. Starter and  
37 Ampere Alternator  
SAE Operating Capacities\* ... **4510** 1150 lb (522 kg)  
**4610** 1225 lb (556 kg)  
Shipping Weights ..... **4510** 4150 lb (1868 kg)  
**4610** 4310 lb (1940 kg)  
Volumetric Capacities & Deliveries ..... 14 gallon  
(53 liter) Hydraulic System Reservoir  
13 gallon (49 liter) Fuel Tank  
16 gpm (1.01 liter/s) each Hydrostatic Pump  
16 gpm (1.01 liter/s) Hydraulic System Pump

\*Operating capacity rated with 65" (1651) Wide Utility  
Bucket, 10.00 x 16.5 Tires and a 175 lb (79 kg) operator,  
according to SAE J818

### Optional Features (Selectable)

7.00 x 15 6-ply Tire & Wheel Set  
10.00 x 16.5 6-ply Flotation Tire & Wheel Set

### Standard Features

Tandem-mounted Hydrostatic Pumps and Motors  
Self-leveling for Attachment (Bucket or Fork)  
0 to 6.5 mph (0 to 11 kmh) Travel Speed  
SAE Approved ROPS-FOPS (Overhead Guard), spring  
balanced with Self-activating Rollback Lock Safety  
Mechanism  
10 Micron Hydraulic System Filtration  
Split Side-mounted Propulsion and Lift/Tilt Control  
T-bars  
Electrical Seat-actuated Lift Cylinder Lock and Starter  
Disconnect Switches  
Operator Secondary Restraint Bar

Lower Radiator Hose Heater  
Hand-operated (Parking/Emergency) Brake  
SAE J386 Construction-approved Seat Belt  
Emergency Hydrostatic Lockouts for Towing  
Mechanical Lift Cylinder Lock  
Hand-operated Throttle with Foot-operated Accelerator Pedal  
Hydro-lock Mechanism for Attachment (Bucket or Fork) Mounting  
Overhead Instrument and Control Panel  
Hinged Rear Guard  
Removable Bellyplate Access Cover  
Air Cleaner with Condition Indicator  
Operator's Compartment Entry and Exit Handles  
Louvered Engine Access Cover

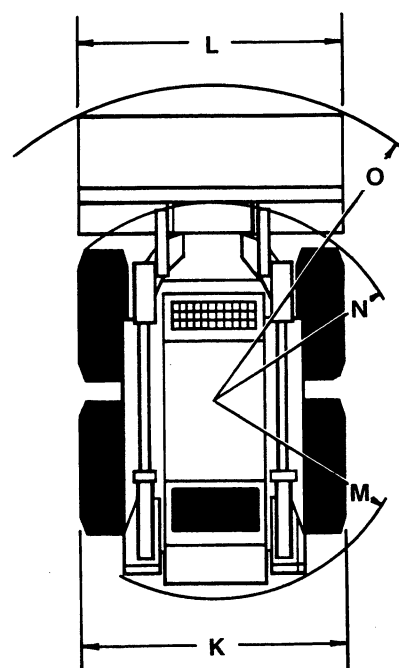
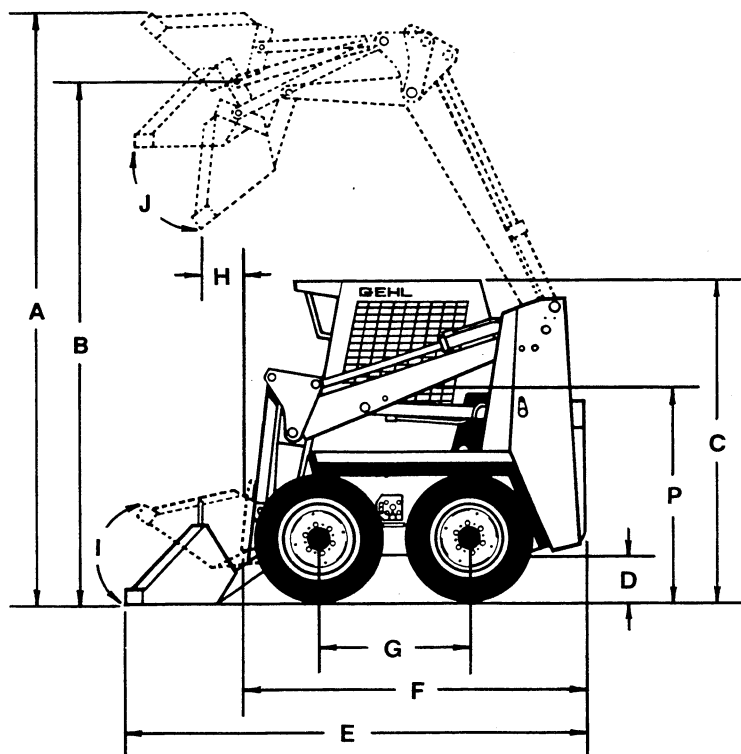
### Accessories

Auxiliary Front Hydraulics  
Work & Warning Light  
Horn  
Hydraulic Oil Heater  
Drawbar  
Grapple Fork (for Manure Fork or 60" Utility Bucket)  
Dirt & Rock Teeth Kit (for Bucket attachment)  
Manure Fork  
Pallet Fork with Two 36 (914) long Tines  
Sound-deadening Package  
Backhoe  
Amber Beacon Warning Light  
Back-up Audible Alarm  
All-weather Operator's Compartment Vinyl Enclosure  
All-weather Operator's Compartment Glass and Metal Enclosure  
Wiper Kit for Glass and Metal Enclosure Door  
Heater and Defroster Kit for Enclosures

### Buckets & Heaped Capacities\*\*

	ft <sup>3</sup>	m <sup>3</sup>
40 (1016) Wide Cement	10.5	0.32
60 (1525) Wide Utility	9.5	0.29
65 (1650) Wide Utility	10.5	0.32
65 (1650) Wide Light Material	13	0.39
65 (1650) Wide Granular Fertilizer	17	0.51
72 (1830) Wide Produce	22	0.66

\*\*For average volumes/weights, for different materials,  
refer to the Operation chapter of this manual.



#### key to illustration

- A.** Overall Operation Height --  
Fully Raised ..... 136 (3454)
- B.** Height to Hinge Pin --  
Fully Raised ..... 114-1/2 (2908)
- C.** Overall Height with Operator Guard ... 76 (1930)
- D.** Ground Clearance ..... 8 (203)
- E.** Overall Length  
(w/utility bucket) ..... 114-3/4 (2915)
- F.** Overall Length less Bucket ..... 88-1/2 (2248)
- G.** Wheel Base ..... 36 (914)
- H.** Dump Reach ..... 18 (457)
- I.** Rollback at Ground ..... 33°
- J.** Dump Angle ..... 41°
- K.** Overall Width --  
(10.00 x 16.5 tires) ..... 63 (1600)
- L.** Bucket Width  
(w/utility bucket) ..... 65 (1651)
- M.** Clearance Circle -- Rear ..... 54 (1372)
- N.** Clearance Circle -- Front  
(less bucket) ..... 45-1/2 (1156)
- O.** Clearance Circle -- Front  
(w/utility bucket) ..... 70 (1778)
- P.** Seat to Ground Height ..... 36 (914)

**Operating capacity rated with 65" (1651) Wide Utility Bucket and 10.00 x 16.5 Tires**

# CHAPTER 3

## CHECK LISTS

### PRE-DELIVERY

The following Checklist is an important reminder of valuable information and inspections which **MUST** be made before delivering the Loader to the Customer. Check off each item after prescribed action is taken.

Check that:

- \_\_\_ **NO** parts of the unit have been damaged in shipment. Check for such things as dents and loose or missing parts; correct or replace components as required. Remove shipping wooden Rear Bumper.
- \_\_\_ Fuel Tank, Fuel Lines and Fittings are **NOT** damaged, leaking or loosely secured.
- \_\_\_ Battery is securely mounted and **NOT** cracked and that Cable connections are tight. (Batteries for domestic sales are filled at the factory.)
- \_\_\_ Lift and Tilt Cylinders are **NOT** damaged, leaking or loosely anchored.
- \_\_\_ Hydrostatic Motors and Pumps are **NOT** damaged, leaking or loosely anchored.
- \_\_\_ Hydraulic Hoses and Fittings are **NOT** damaged, leaking or loosely secured.
- \_\_\_ Radiator Hoses and Fittings are **NOT** damaged, leaking or loosely secured.
- \_\_\_ Oil Filters are **NOT** damaged, leaking or loosely secured.
- \_\_\_ Wheels are properly and securely attached and Tires are properly inflated.
- \_\_\_ Entire Loader is properly lubricated, **NO** Fittings are missing, and that the Hydraulic system Reservoir, the Engine Crankcase, the Drive Chain Cases, and the Diesel Governor (as applicable) are filled to their proper operating levels.
- \_\_\_ All adjustments are made to comply with the settings given in the Adjustments chapter of this manual.
- \_\_\_ All Guards, Shields and Decals are in place and securely attached.
- \_\_\_ Model and Serial Numbers of this unit are recorded in spaces provided on this and page 2.

**Start the Loader Engine and test-run the unit while checking that proper operation is exhibited by all controls.**

Check that:

- \_\_\_ Drive Chains are properly adjusted.
- \_\_\_ Propulsion Control and Lift/Tilt Control T-bars operate properly and are **NOT** damaged or binding.
- \_\_\_ Propulsion Control T-bar is properly adjusted for a correct "neutral" position so that Loader does **NOT** creep.
- \_\_\_ Electrical Seat-actuated Lift Cylinder Lock and Starter Disconnect systems function properly. By design, the Engine will **NOT** start unless Operator is on the Seat and the Restraint Bar is "lowered". Furthermore, the Lift Arms will **NOT** lower unless

the Operator is on the Seat, the Restraint Bar is "lowered" and, the Ignition Key is in the "Run" position.

I acknowledge that pre-delivery procedures were performed on this unit as outlined above.

Dealership's Name

Dealer Representative's Name

Date Checklist Filled-out

Model Number

Loader Serial #

Engine Serial #

### DELIVERY

The following Checklist is an important reminder of valuable information that **MUST** be passed on to the Customer at the time the unit is delivered. Check off each item as you explain it to the Customer.

- \_\_\_ Give the Customer his Operator's Manual. Instruct him to be sure to read and completely understand its contents **BEFORE** operating the unit.
- \_\_\_ Direct him on how to use the Index of this manual as a quick page number locating guide.
- \_\_\_ Explain and review with him the **SAFETY** chapter of this manual.
- \_\_\_ Explain and review with him the Controls & Safety Equipment chapter of this manual.
- \_\_\_ Demonstrate the recommended method (outlined in Operation chapter) of attaching and detaching a Bucket or Fork.
- \_\_\_ Explain that regular lubrication is required for continued proper operation and long life. Review with him the Lubrication chapter of this manual.
- \_\_\_ Explain and review with him the Service chapter of this manual.
- \_\_\_ Explain the importance of his thorough understanding of and familiarity with the Loader Controls **BEFORE** attempting to operate the Loader. Refer to the appropriate information in the Operation chapter.
- \_\_\_ Explain that he **MUST** consult the Engine Manual (provided) for related specifications, operating adjustments and maintenance instructions.
- \_\_\_ Completely fill out Owner's registration, including Customer's signature, and return it to the GEHL Company.

I acknowledge that above points were reviewed with me at the time of delivery.

Customer's Signature

Date Delivered

(Dealer's File Copy)

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**(To be removed as Dealer's File Copy)**

# CHAPTER 3

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- \_\_\_ Battery is securely mounted and **NOT** cracked and that Cable connections are tight. (Batteries for domestic sales are filled at the factory.)
- \_\_\_ Lift and Tilt Cylinders are **NOT** damaged, leaking or loosely anchored.
- \_\_\_ Hydrostatic Motors and Pumps are **NOT** damaged, leaking or loosely anchored.
- \_\_\_ Hydraulic Hoses and Fittings are **NOT** damaged, leaking or loosely secured.
- \_\_\_ Radiator Hoses and Fittings are **NOT** damaged, leaking or loosely secured.
- \_\_\_ Oil Filters are **NOT** damaged, leaking or loosely secured.
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- \_\_\_ Entire Loader is properly lubricated, **NO** Fittings are missing, and that the Hydraulic system Reservoir, the Engine Crankcase, the Drive Chain Cases, and the Diesel Governor (as applicable) are filled to their proper operating levels.
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- \_\_\_ Model and Serial Numbers of this unit are recorded in spaces provided on this and page 2.

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the Operator is on the Seat, the Restraint Bar is "lowered" and, the Ignition Key is in the "Run" position.

I acknowledge that pre-delivery procedures were performed on this unit as outlined above.

---

Dealership's Name

---

Dealer Representative's Name

---

Date Checklist Filled-out

---

Model Number

---

Loader Serial #

---

Engine Serial #

### DELIVERY

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- \_\_\_ Explain that he **MUST** consult the Engine Manual (provided) for related specifications, operating adjustments and maintenance instructions.
- \_\_\_ Completely fill out Owner's registration, including Customer's signature, and return it to the GEHL Company.

I acknowledge that above points were reviewed with me at the time of delivery.

---

Customer's Signature

---

Date Delivered

(Pages 5 and 6 Have Been Removed At Perforation)

# CHAPTER 4



## SAFETY



BEFORE YOU ATTEMPT TO OPERATE THIS EQUIPMENT, READ AND STUDY THE FOLLOWING SAFETY INFORMATION. IN ADDITION, MAKE SURE THAT EVERY INDIVIDUAL WHO OPERATES OR WORKS WITH THIS EQUIPMENT, WHETHER FAMILY MEMBER OR EMPLOYEE, IS FAMILIAR WITH THESE SAFETY PRECAUTIONS.

GEHL Company always takes the operator and his safety into consideration when designing machinery and guards exposed moving parts for his protection; however, some areas cannot be guarded or shielded in order to assure proper operation. In addition, the operator's manual and decals on the machine itself warn you of further danger and should be read and observed closely.

The safety alert symbol above means **ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!** It stresses an attitude of "HEADS UP" for safety and can be found throughout this operator's manual and on the unit itself.

**Remember:** The careful operator is the best operator. Most accidents are caused by human error. Certain precautions must be observed to prevent the possibility of injury or damage.

Please read the rules listed below for safe operation **BEFORE** you operate this equipment.

Use of the word **CAUTION**, **WARNING** or **DANGER** herein and on the machine itself signals three degrees of hazard. **CAUTION** is used for general reminders of good safety practices or to direct attention to unsafe practices. **WARNING** is used to denote a specific potential hazard. **DANGER** is used to denote the most serious specific potential hazard.

**NEVER** operate Loader without wearing Seat Belt!

**NEVER** attempt to operate Loader unless Operator Secondary Restraint Bar is "lowered"!

### MANDATORY SAFETY SHUTDOWN PROCEDURE

Work of any type on machinery is always more dangerous when the machine is operating. **BEFORE** cleaning, adjusting, lubricating or servicing this unit, the following **MANDATORY SAFETY SHUTDOWN PROCEDURE** should **ALWAYS** be followed:

1. Move the Propulsion Control T-bar to the "neutral" position.
2. Lower the Lift Arms completely and roll the Attachment (Bucket or Fork) forward so that the front edge is in contact with the ground.
3. Engage the Hand Brake.
4. Move the Throttle to the slow idle position, shut the Engine off and remove the Ignition Key.
5. If the Lift Arms **MUST** be left in the "raised" position, **BE SURE** to properly engage the Mechanical Lift Cylinder Lock instead of performing step 2.

GEHL Skid Loaders are designed and intended to be used **ONLY** with a mounted GEHL Company Attachment (Bucket or Fork) or with an approved (by GEHL) accessory Attachment! The GEHL Company can **NOT** be responsible for operator safety if used without a recommended and approved Attachment!

Some photographs, used herein, may show Door(s), Guard(s) or Shield(s) open or removed for illustration purposes **ONLY!** **BE SURE** that all Door(s), Guard(s) or Shield(s) are in their proper position(s) and securely attached **BEFORE** operating the Loader!

Read and observe **ALL** Safety information and Decals on the Loader **BEFORE** operating the unit! In addition, familiarize yourself with **ALL** of the Safety Devices and periodically check that they are functioning properly!

The stability of a Skid Loader is determined by its desirable but short wheel base. Any or all of the following elements: the terrain, the Engine speed, the load being carried or dumped, and/or abrupt T-Bar movements, can affect stability! **IF MISUSED, ANY OF THE ABOVE FACTORS CAN CAUSE THE LOADER TO TIP, THROWING YOU FORWARD OR OUT OF THE UNIT, CAUSING DEATH OR SERIOUS BODILY INJURY!** Therefore, **ALWAYS** have the Operator Secondary Restraint Bar "lowered" and wear the Seat Belt. Operate the Control T-Bars smoothly and gradually at an appropriate Engine speed which matches the operating conditions!



# SAFETY

(Continued)



**BEFORE** leaving the Operator's Compartment, engage the Hand Brake and remove the Ignition Key!

Rest the Attachment (Bucket or Fork) on the ground when the Loader is NOT being used!

**BE SURE** that both Control T-bars are in their "neutral" positions **BEFORE** attempting to start the Loader Engine!

For additional stability when operating on inclines or ramps, **ALWAYS** travel with the heavier end of the Loader in the same direction as the top of the incline!

**ALWAYS** carry the loaded Attachment as low as possible and travel with the Lift Arms down, to insure maximum stability!

To prevent unexpected and undesired Attachment release from the Lift Arms, **BE SURE** to secure the Hydro-lock Handles to the Anchor Pins on the Hydro-lock Mechanism with Lockpins provided, **BEFORE** and while operating the Loader!

Keep **ALL** Guards, Shields and Decals in place and properly secured!

**CAREFULLY** inspect **ALL** Hydraulic Hoses and connections on a routine basis; **NEVER** use your hand, escaping fluid under pressure can cause serious injury!

**ALWAYS** wear Safety Glasses with Side Shields when striking metal against metal! In addition, it is recommended that a softer (non-chipable material) be used to cushion the blow. Failure to heed could result in serious injury to the eye(s) or other part(s) of the body!

**DO NOT** exceed the Loader's rated operating capacity for any Bucket (or Attachment) being used!

**DO NOT** allow minors and personnel, other than a qualified operator, to operate or be near the Loader unless properly supervised; a Skid Loader is a single Seat **NO** passenger machine!

**DO NOT** operate the Loader in a closed or confined area; if necessary, adequate ventilation **MUST** be provided!

**DO NOT** leave the Operator's Compartment with the Lift Arms raised, unless the Mechanical Lift Cylinder Lock and the Hand Brake are properly engaged and the Ignition Key is removed!

**DO NOT** extend your feet beyond the front bounds of the Operator's Compartment!

**DO NOT** raise or drop a loaded Bucket or Fork suddenly! Abrupt movements under load can cause serious instability!

**DO NOT** push the Lift/Tilt Control T-bar all the way forward (into the "float" position) with the Attachment loaded and the Lift Arms raised as this will cause the Lift Arms to drop!

**DO NOT** drive too close to an excavation or ditch; **BE SURE** the surrounding ground has adequate strength to support the weight of the Loader and the load!

**DO NOT** attempt to tow the Loader without first engaging the Emergency Hydrostatic Lockouts!

**DO NOT** attempt to remove the Radiator Cap when the Engine is **HOT**, running or overheated. Coolant is extremely **HOT** and under pressure. Wait for the Engine to cool **BEFORE** relieving the pressure and removing the Radiator Cap!

**REMEMBER!** It is the owner's responsibility for communicating information on the safe use and proper maintenance of this machine!

# CHAPTER 5

## CONTROLS & SAFETY EQUIPMENT

This Skid Loader is provided with features for operator safety and convenience.



**CAUTION:** Become familiar with and know how to use **ALL** safety devices and controls on the Skid Loader **BEFORE** attempting to operate the unit. Know how to stop Loader operation **BEFORE** starting it. This GEHL Skid Loader is designed and intended to be used **ONLY** with a mounted GEHL Company Attachment (Bucket or Fork) or an approved (by GEHL) accessory attachment. The GEHL Company can **NOT** be responsible for operator safety if used without a recommended and approved Attachment.

### CHOKE (SL4510 model only) (Fig. 5-1)

A Choke Knob and Cable linkage is provided on the Gasoline Engine model Skid Loader (SL4510) for cold starting assistance, when required. The Choke Knob is located in front of and below the Seat assembly. After the Engine has warmed-up and is running smoothly, **BE SURE** to push the Knob in all the way.

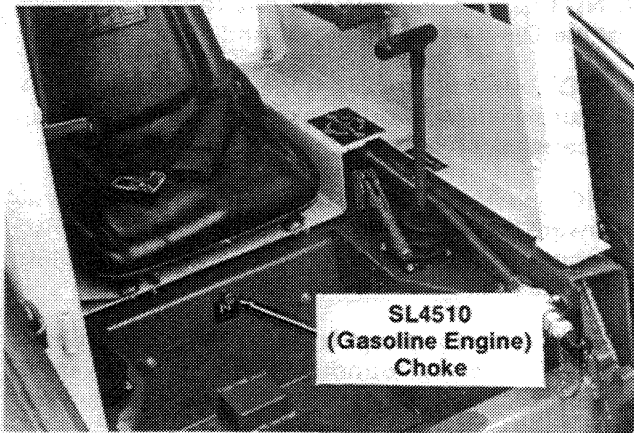


Fig. 5-1

### ELECTRICAL SEAT-ACTUATED LIFT CYLINDER LOCK

The Hydraulic Cylinders, which control the Lift Arms, have their rear ports connected through a Solenoid Valve which is controlled by a Relay which is activated by a pressure-sensitive Switch mounted in the Loader Seat. When the Operator sits on the Seat and the Ignition Key is "on", the Seat Switch contacts are closed, which activated the Relay contacts to close the circuit to the Solenoid Valve allowing normal oil flow through the Lift Cylinders. If the Operator leaves the Seat or shuts-off the Ignition Key, the Relay contacts open and power to the Solenoid Valve is turned-off which blocks oil flow

from the rear ports of the Cylinders. When the flow is blocked, the Cylinders will hold their positions and thus stop Lift Arm travel.



**CAUTION:** Operation of the Electrical Seat-actuated Lift Cylinder Lock system should be tested frequently to insure proper operation at all times. **NEVER** attempt to defeat system function by mechanically or electrically bypassing the Switch, Relay or Solenoid.

### ELECTRICAL SEAT-ACTUATED STARTER DISCONNECT

A second Relay, which is activated by the pressure-sensitive Switch mounted in the Loader Seat, is provided to control operation of the Starter circuit in the Ignition system. When the Operator sits on the Seat, the Seat Switch contacts close which activates the Relay contacts to close the Starter circuit. The Switch is a safety device which makes it necessary for the Operator to always be seated on the Seat in order to start the Engine. The Engine will **NOT** stop however, if the Operator leaves the Seat with the Engine running.



**CAUTION:** Operation of the Electrical Seat-actuated Starter Disconnect system should be tested frequently to insure proper operation at all times. **NEVER** attempt to defeat system function by mechanically or electrically bypassing the Switch, Relay or Solenoid.

### FRONT HYDRAULICS (OPTIONAL) (Fig. 5-2)

Skid Loaders, which are equipped with optional (factory or field installed) Auxiliary Hydraulics, have Footpedals protruding through access holes in the Front Floorplate. The Footpedals are used to control operation of the Auxiliary Valve and the direction of oil flow into and out of the Quick-disconnect Fittings which are mounted on the front left portion of the Lift Arms. Depressing the Left Pedal causes flow out of the Male Disconnect and depressing the Right Pedal causes flow out of the Female Disconnect.

### GUARDS, SHIELDS & COVERS

Whenever and wherever possible and without affecting Loader operation, Guards, Shields and Covers have been used on the unit to protect potentially hazardous areas. In many places, Decals are also provided to warn of potential dangers as well as to display special operating procedures.



**WARNING:** Read and observe **ALL** Warnings on the unit **BEFORE** attempting to operate the Loader. Do **NOT** attempt to operate this equipment unless **ALL** factory installed Guards and Shields are properly secured in place.



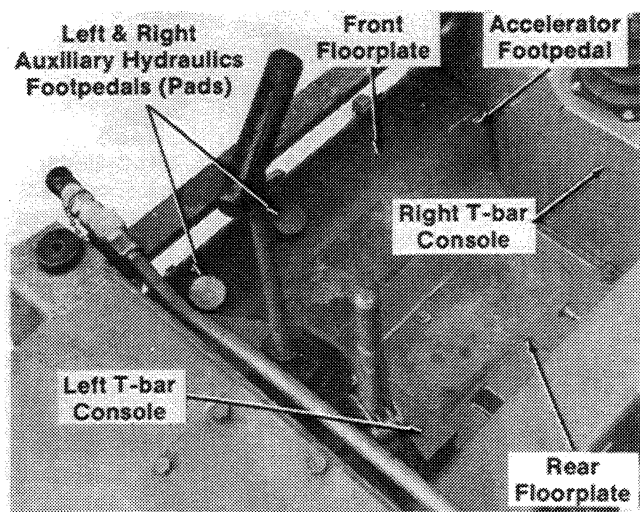


Fig. 5-2

### Bolt-on Shields & Covers (Figs. 5-2 & 5-3)

Conveniently removable bolted-on Consoles (Covers) are provided over the Propulsion Control and Lift/Tilt Control T-bar pivots. A bolted-on Front Floorplate is provided for access to the Hand Brake Calipers and Brake Discs. A bolted-on Rear Floorplate is provided for access to the Hydraulic System Pump, the Hydrostatic Pumps and the T-bar Linkages. A bolted-on Bellyplate is provided for access to the Engine oil pan and drain plug. A bolted-on Cover is also provided for entry into the Hydraulic Oil Reservoir for Oil Strainer removal.

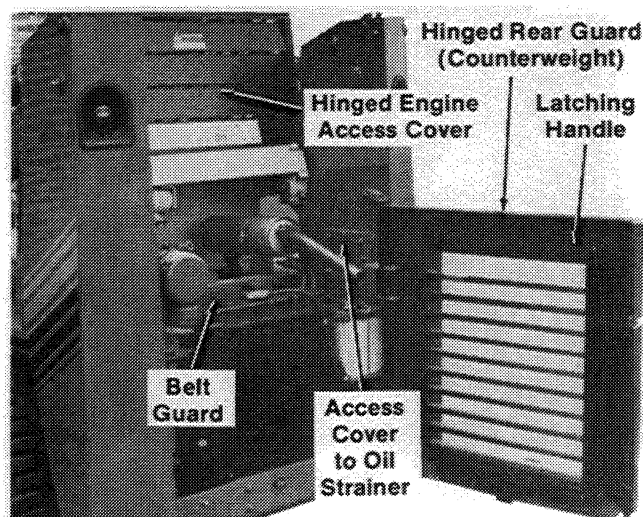


Fig. 5-3

### Hinged Guards (Fig. 5-3)

A hinged Rear Guard is provided on the back of the Loader to gain access to service locations such as the Hydraulic System Oil Filter, Radiator and Drain Cock and Radiator Hose Heater. A hinged and louvered Engine Access Cover is provided behind the Overhead Guard for convenient access to service locations such as the Air Cleaner, Fan Belt and Engine components.

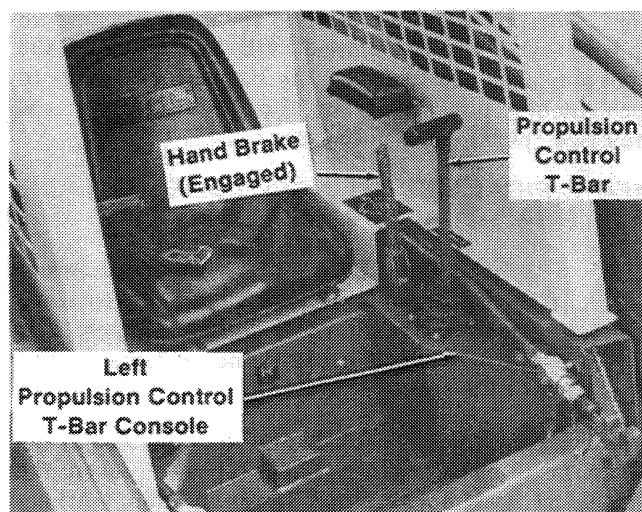


Fig. 5-4: Hand Brake "Engaged"

### HAND BRAKE (Fig. 5-4)

All Skid Loaders have a Hand Brake which functions as both a parking brake and an emergency brake. The Hand Brake Handle is linked by Cables to Disc Brake assemblies on the Hydrostatic Motor Drive Sprockets. As a parking brake, the Hand Brake locks the positions of the Hydrostatic Motor Drive Sprockets to prevent the Wheels from turning. As an emergency brake, the Hand Brake can be gradually engaged to slow-down and stop the rotation of the Drive Shafts.



**CAUTION:** Function and adjustment of the Hand Brake should be checked on a routine basis to maintain proper operation at all times.

**NOTE:** The Hand Brake is NOT designed for NOR intended to be used as the normal means of stopping forward or reverse movement of the Loader. The Propulsion T-bar Control, when it is returned to the "neutral" position, provides Hydrostatic braking and is the preferred primary means for stopping Loader movement.

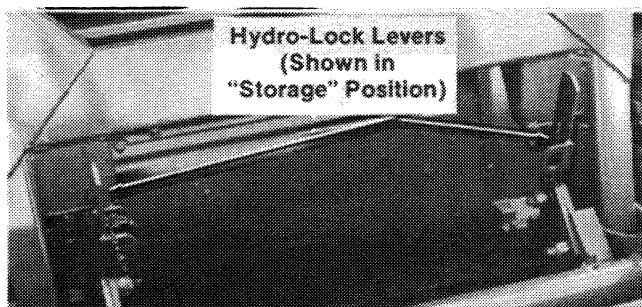


Fig. 5-5

### HYDRO-LOCK LEVERS (Fig. 5-5)

Hydro-lock Levers are provided on the Skid Loader to conveniently hook-up and lock the Attachment (Bucket or Fork) onto the front of the Lift Arms. The Hydro-lock Latching and Locking Mechanism enables use of

the Loader Hydraulics system to facilitate hooking-up and removing the Attachment. **BE SURE** to use the Lockpins provided to secure the Hydro-lock Levers to the Anchor pins in either the “attached” or the “released” positions of both Levers.

### MECHANICAL LIFT CYLINDER LOCK (Figs. 5-6 & 5-7)



**WARNING: ALWAYS** use the Mechanical Lift Cylinder Lock when the Lift Arms are raised and **BEFORE** leaving the Operator's Compartment to work around the outside of the Loader with the Lift Arm raised.

A Mechanical Lock is provided on the right side of the Lift Arms to be used as a Cylinder block to prevent the Lift Arms from unexpectedly lowering while working around the Loader while the Lift Arms are raised. When the Lock is **NOT** being used, it can be stored on the Anchor Pin on the underside of the Lift Arm using the Lockpin provided. Refer to details in the Operation chapter for correct engagement and disengagement procedures. The Lift Cylinder Lock is a safety device which should always be kept in proper operating condition at all times.

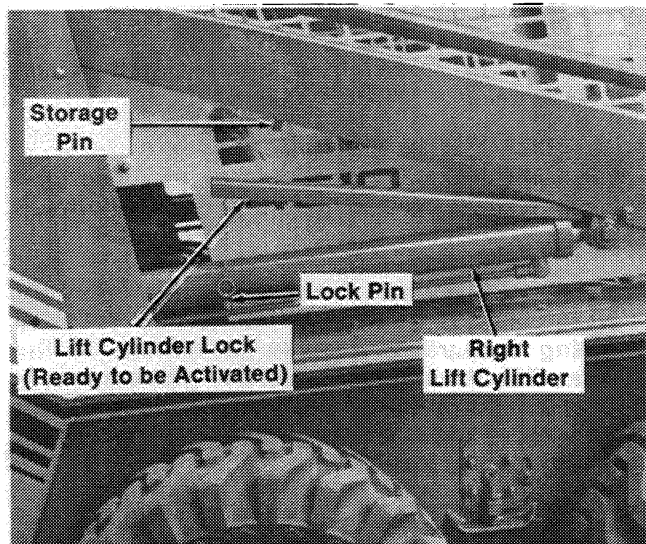


Fig. 5-6

### OVERHEAD GUARD & LOCK MECHANISM (See Fig. 5-7)

The Overhead Guard, provided on all Skid Loaders, is SAE ROPS and FOPS approved. The Guard is designed to protect the operator from falling objects and to be a protection if the Loader is accidentally tipped-over or rolled, when the operator is maintained within the confines of the Overhead Guard by the Seat Belt. A Window is provided in the back side of the assembly to help reduce Engine noise. When the Guard is unbolted and rolled-back, a self-actuating Lock Mechanism engages a hole in the Riser to maintain the Guard in the rolled-back position.

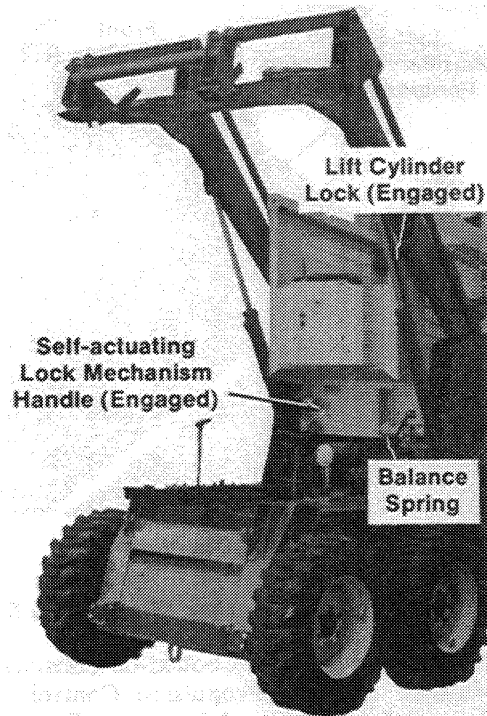


Fig. 5-7: Overhead Guard Unbolted, Rolled-back & Locked

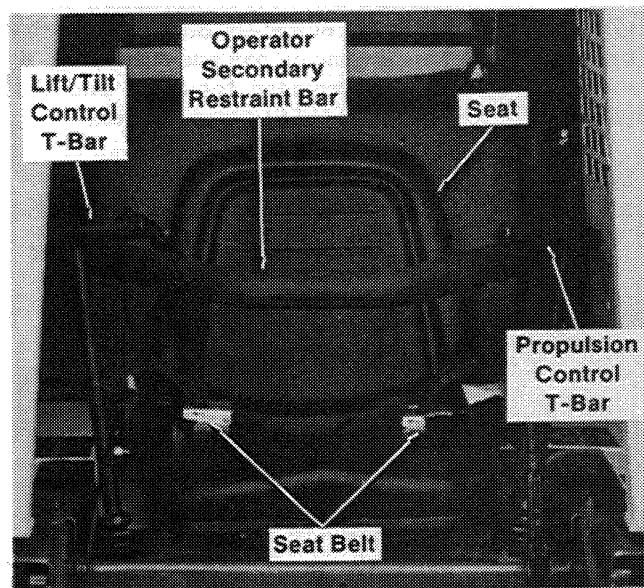


Fig. 5-8

### OPERATOR SECONDARY RESTRAINT BAR (Fig. 5-8)

The Operator Secondary Restraint Bar is a sturdy Bar which is securely anchored to the Overhead Guard. It is designed to be pivoted up, when leaving, or down, after entering, the Operator's Compartment. When used in conjunction with the Seat Belt, the Secondary Restraint Bar serves to keep the Operator in the Operator's Compartment. The Restraint Bar is also electrically interconnected with the Seat-actuated Lift Cylinder Lock and

Starter Disconnect circuits so that the Lift Arms will **NOT** lower and the Engine can **NOT** be started unless the Operator is on the Seat and the Restraint Bar is "lowered".

For operator comfort and convenience, the Restraint Bar is fully padded and intended to serve as an arm rest, while operating the Loader.



**CAUTION: NEVER attempt to disconnect the Operator Secondary Restraint Bar, it is there to protect your life!**

### OVERHEAD INSTRUMENT & CONTROL PANEL (Fig. 5-9)

The Overhead Instrument and Control Panel contains several Loader and Engine controls and function Indicators. Internationally recognized standard symbols are provided on the Panel for representations of various functions, conditions and Switch positions.

#### Battery Charge and Oil Pressure Warning Lights

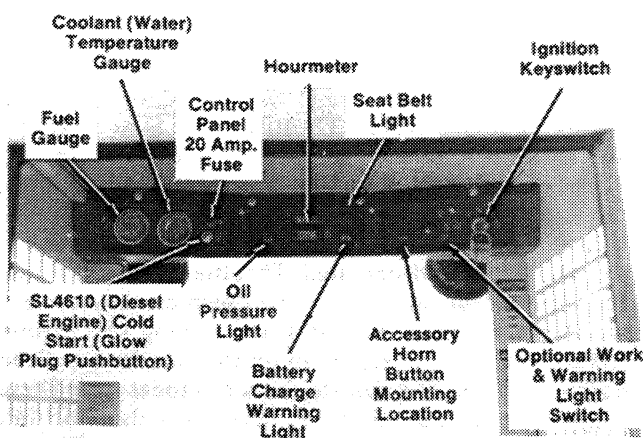
Square-framed Indicator Lights are provided on the right and left sides of the Hourmeter to warn (when lighted) of malfunctions in the respective Engine Oil and Battery Charging systems, when the Engine is running. When the Engine is **NOT** running and the Ignition Key is in either the "on" (run) position or the "accessory" position, both Indicator Lights will be lighted; this can be termed the "bulb-test" position. **BE SURE** to return the Ignition Key to "off" and remove the Key when leaving the Operator's Compartment.

#### Cold Start Button (SL4610 model only)

On a Diesel Engine model SL4610 Skid Loader, a push (and hold) type Button is provided, to the left of the Battery Charge Warning Light, for operating the Glow Plugs for cold starting assistance. Push and hold the Button for 30 seconds to 1 minute, depending on outside temperature.

#### Control Panel Fuse

A Fuse Holder is provided on the left side of the Panel to protect the wiring to the Switches, Gauges and Indicators from overloads due to circuit malfunction or accidental grounding. The Holder accepts an SAE 20 ampere in-line style Fuse.



**Fig. 5-9: Overhead Instrument & Control Panel**

**NOTE:** Do **NOT** attempt to defeat the fusing by jumping the Holder or by using a higher amperage fuse.

#### Fuel Level and Water Temperature Indicator Gauges

Two Gauges are provided on the left side of the Panel for monitoring the fuel level and the Cooling system water temperature. The Fuel Gauge has three division marks between empty and full to represent the amount of fuel remaining in the 13 gallon (49 liter) Fuel Tank. The Water Temperature Gauge has both Fahrenheit and Celcius scales for full range coolant temperature indication. Under normal operating conditions the water temperature will be at approximately 185F (85C). Under peak loading conditions, operating temperatures may rise as high as 220F (105C).

#### Horn Button (Accessory)

An accessory Horn Kit can be field installed on the Skid Loader, when desired. By design, the Horn is installed on the underside of the Overhead Guard. A location for the Pushbutton Switch is already marked on the Instrument and Control Panel. The power connection lead, between the Button and the Horn, is already provided in the Wiring Harness.

#### Hourmeter

An Hourmeter is provided in the center of the Panel for added convenience in proper routine maintenance performance. The Hourmeter has a capacity for 9999 hours of operating time, a 1/10 hour Indicator and a "running" Indicator. The Hourmeter is especially useful in keeping up the log in the back of this manual. Refer to the Maintenance Chart provided on the bottom side of the louvered Engine Compartment Access Cover.

#### Ignition Keyswitch

The Ignition Keyswitch, which is located on the right end of the Panel, is similar in function and operation to the Keyswitch on a car or truck. International symbols, around the perimeter of the Switch, denote the functions and positions the Key can be moved to. In a clockwise rotation, the positions are: Accessories, Off, On (Run) and Start.

**NOTE:** The Key **MUST** always be returned to the "off" position between starting attempts.

#### Light Switch (Accessory)

An accessory Light Kit can be (factory or field) installed on the Skid Loader, when desired. The Light Switch is mounted on the Panel in the position to the left of the Starter Keyswitch. International symbols denote the four positions of the Light Switch. In a clockwise direction of rotation, these positions are: Off, Flashers, Headlights with Flashers and Red Rear Light, and Headlights with Rear Worklight. For the Lights to operate, the Ignition Keyswitch **MUST** be in either the "Accessories" or the "On" (Run) position.

## Seat Belt Warning Light & Buzzer

Audible and visual alarm indicators are provided to remind the Operator of fastening his Seat Belt. The Warning circuit operates for a few seconds after the Ignition Key is activated, then, it self-extinguishes. The Warning Buzzer is mounted behind the panel and a Square-framed Indicator Light is located on the Instrument Panel to the left of the Hourmeter.



**CAUTION: BE SURE to fasten and properly adjust your Seat Belt and lower the Restraint Bar BEFORE starting the Loader Engine. When properly adjusted, the Seat Belt Buckle should be centered and Belt slack should be minimal.**

## SEAT POSITIONING (See Fig. 5-4)

The Loader Seat is secured on Rails to facilitate repositioning the Seat ahead or backwards to adapt to the operator's size and comfort. A Spring-loaded Latch Handle is provided for adjusting and locking the adjusted Seat position.

## SELF-LEVELING

A Self-leveling feature is designed into the Lift system which maintains the Bucket or Fork position level while the Lift Arms are raised or lowered. This convenience feature provides more operator freedom to concentrate on Loader movements to get the work done more quickly and efficiently.

## IN-LINE CIRCUIT FUSE

An in-line 25 ampere Fuse is provided to protect the wiring in the Engine Wiring Harness from overloads due to circuit malfunction or accidental grounding. Refer to the Electrical Wiring diagrams provided in the Service chapter of this manual for Fuse location.

## T-BARS

Split side-mounted T-bars are provided on the Skid Loader to control the hydraulic and hydrostatic functions of the Loader.



**CAUTION: ALWAYS place both T-bars in their "neutral" positions BEFORE attempting to start the Engine. Excessive speed for either T-bar movements and operations with NO regard for conditions and circumstances can be hazardous.**

## Propulsion Control T-bar (See Fig. 5-6)

The left hand T-bar is the Propulsion Control which is linked to the Hydrostatic Transmissions. Push the T-bar straight (without twisting) forward from the neutral detent to cause a forward Loader movement. Pull the T-bar straight (without twisting) backward from the neutral detent to cause a rearward Loader movement. Twisting the T-bar clockwise will cause a spin turn to the right. Twisting the T-bar counterclockwise will cause

a spin turn to the left. On a spin turn, the Wheels (opposite the direction of the turn) will rotate forward and the Wheels (on the same side as the direction of the turn) will rotate rearward. When the T-bar is moved slightly forward or rearward and twisted, a slow gradual forward or rearward turn will be maneuvered. The farther the T-bar is moved forward or rearward or twisted in either direction, the faster the resulting maneuver will be made. Engine RPM also has a directly proportional affect on movement.

## Lift/Tilt Control T-bar (Fig. 5-10)

The Right hand T-bar is the Lift (Arm) and Tilt (Attachment) Control which is linked to the Loader Hydraulic Control Valve. Twisting the T-bar clockwise dumps the Bucket and twisting it counterclockwise rolls the Bucket up or back. Pushing the T-bar straight forward (without twisting) lowers the Lift Arms and pulling the T-bar straight back (without twisting) raises the Lift Arms. Pushing the T-bar all the way forward, past the detent, places the Lift Arms in the "float" condition. The speed of all movements controlled by the Lift/Tilt Control T-bar is directly proportional to the amount of T-bar movement and the Engine RPM.

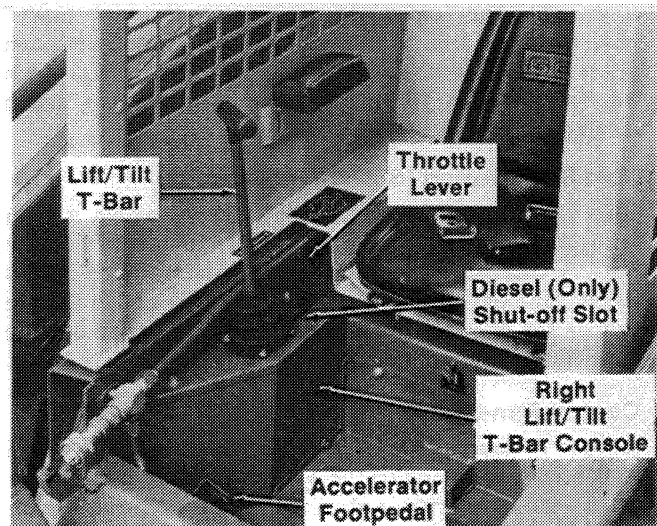


Fig. 5-10

## THROTTLE & ACCELERATOR PEDAL (Fig. 5-10 & See Fig. 5-2)

A right-hand controlled Throttle Lever is provided for adjusting the Engine RPM. When desired, the right-foot operated Accelerator Pedal is also provided to increase the Engine RPM to match increased power requirements. The Pedal linkage is spring-loaded to return to the adjusted hand-operated Throttle setting. Pushing the Throttle forward or pushing down on the Accelerator Pedal increases the RPM and pulling the Throttle Lever backward or letting-up on the Accelerator Pedal decreases the RPM. On the Loader model with Diesel Engine, an integral "shut-off" position is also built-into the Throttle mechanism at the slow end of the Throttle Lever travel.

# CHAPTER 6

## OPERATION



**CAUTION: BEFORE starting the Skid Loader Engine and operating the Loader, review and comply with ALL Safety recommendations set forth in the SAFETY chapter of this manual. Know how to STOP the Loader BEFORE starting it. BEFORE starting the Loader Engine, BE SURE to fasten and properly adjust the Seat Belt.**

### GENERAL INFORMATION (Fig. 6-1)

#### Stopping Loader

The following procedure is the recommended sequence for stopping the Loader:

1. Move the Propulsion Control T-bar to the "neutral" position.
2. Using the Lift/Tilt Control T-bar, completely lower the Lift Arms and rest the front edge of the Attachment (Bucket or Fork) on the ground.
3. Pull the Throttle back to the "idle" position (toward Turtle symbol).
- 4a. **On a Gasoline Engine model only**, turn the Ignition Key to the "off" position to shut the Engine off.
- 4b. **On a Diesel Engine model only**, move the Throttle Lever back to the "slow idle" position and deflect it slightly to move the Lever into the "stop" notch and to stop the Diesel Engine. Then, turn the Ignition Key to the "off" position.
5. Engage the Hand Brake, raise the Restraint Bar, unlatch your Seat Belt and climb out of the Operator's Compartment.

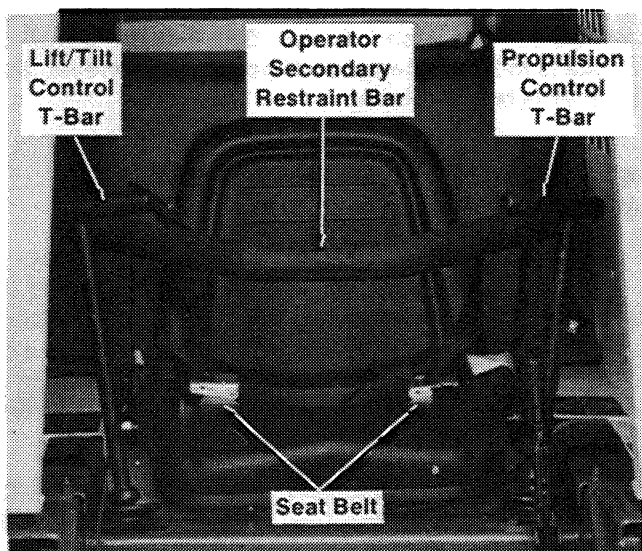


Fig. 6-1

#### Before Starting Engine

Before actually starting the Engine and running the Loader, familiarize yourself with the Control T-bars to coordinate your mind with your hand movement. Grasp the T-bars and move them in the appropriate directions to simulate the various movements of the Loader, Lift Arms and Attachment.

#### Starting Engine

The following procedure is recommended for starting either a gasoline or diesel powered Loader:

1. Enter the Operator's Compartment.
2. Sit on the Seat, fasten your Seat Belt and lower the Restraint Bar.



**CAUTION: ALWAYS fasten your Seat Belt BEFORE starting the Loader Engine. Leave the Hand Brake "engaged" until the Engine is running and you are ready to operate the Loader. Keep your left hand on the Propulsion T-bar while starting Engine.**

3. Check that both Control T-bars are in their "neutral" positions.
4. Push the Throttle forward about 1/4 of its full travel.
- 5a. **On a Gasoline Engine model only**, pull the Choke Knob out and turn the Ignition Key to start the Engine. After the Engine is running and becomes sufficiently warmed-up, push in the Choke.
- 5b. **On a Diesel Engine model only**, push and hold the Cold Start Button, located in the Instrument and Control Panel, about 30 seconds to 1 minute (as dictated by the temperature) to operate the Glow Plugs.

**NOTE:** If the Engine runs a short time and dies-out or will NOT start, return the Ignition Key to the "off" position and repeat step 5 until the Engine can be started and kept running. For either model Loader, BE SURE to allow a sufficient warm-up time before attempting to operate the Control T-bars. Do NOT continue to crank the Starter for more than 20 seconds at a time.

#### Stopping Loader Movement

The Hydrostatic Transmissions of the Skid Loader control forward and reverse acceleration and speed. As rapidly as the Propulsion Control T-bar is moved to the straight "neutral" position, movement of the Wheels is slowed accordingly. By all means, **BE SURE** to move the Propulsion Control T-bar gradually and deliberately to slow-down and stop the Wheels.





**CAUTION:** Operate the Propulsion Control T-bar gradually and smoothly when starting, stopping, turning or reversing Loader directions.

#### First-time Practice Running



**CAUTION:** BE SURE the area being used for test-running is clear of spectators and obstructions. Operate the Loader with an empty Attachment.

Smoothest and most efficient Loader operation is achieved while operating the Engine at half Throttle. After the Engine is sufficiently warmed-up, with the right hand slowly and deliberately pull straight back on the Lift/Tilt Control T-bar to raise the Lift Arms. Twist the T-bar to roll the Attachment forward or back. Attempt all raise and lower functions, Attachment roll forward and backward functions, and combinations of the two functions before proceeding to operate the Propulsion Control T-bar. **BE SURE** also to lower the Lift Arms and roll the Attachment back before proceeding to operate the Propulsion Control T-bar.

With your right hand off the Lift/Tilt T-bar, slowly and deliberately move the Propulsion Control T-bar with your left hand straight forward to travel forward with the Loader. Then, slowly pull the T-bar back to "neutral" to stop forward movement. To travel backwards, slowly and deliberately move the T-bar straight back. Then return the Propulsion Control T-bar to the "neutral" position to stop reverse movement. Next, twist the T-bar slowly clockwise to turn right and counterclockwise to turn left. Attempt all forward, reverse and turning movement before proceeding to operate both T-bars at the same time.

Skid Loader operating skills are only obtained through proper coordination of the Loader's forward and reverse movements with raising and lowering Lift Arms and with rolling Attachment forward and backward. To gain proficiency, practice all Control T-bar operations until they happen naturally and without mistake or hesitation.



**CAUTION:** Excessive speed for conditions and circumstances can be hazardous. **ALWAYS** exercise caution and good judgment while operating the Skid Loader.

If the Loader Engine kills while the Lift/Tilt T-bar is being operated to raise the Lift Arms, the Lift Arms will stop rising and hold at the level already reached. Lower the Lift Arms and return the T-bar to "neutral" before attempting to restart the Engine. If the Loader Engine kills while the Lift/Tilt Control T-bar is being operated to lower the Lift Arms, the Arms will continue to lower until they rest against the Loader Frame. Return the T-bar to "neutral" before attempting to restart the Engine.

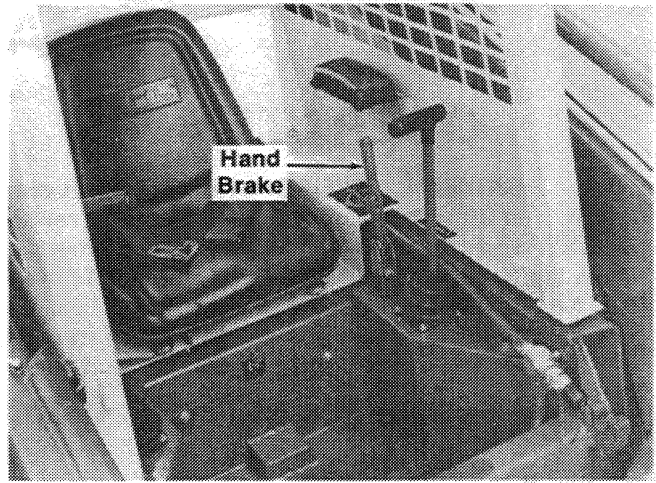


Fig. 6-2: Hand Brake in "Engaged" Position

#### HAND BRAKE (Fig. 6-2)



**CAUTION:** BEFORE leaving the Operator's Compartment, engage the Hand Brake and remove the Ignition Key. **BE SURE** also to lower the Lift Arms or engage the Mechanical Lift Cylinder Lock, as appropriate.

In an **EMERGENCY** or otherwise when it becomes necessary to **STOP** Loader forward or reverse movement **IMMEDIATELY**, return the Propulsion T-bar to neutral, reduce the Engine speed and pull-up on the Hand Brake. The proper sequence for correct Loader operation is to always engage the Brake before shutting off the Loader Engine and to disengage the Brake **ONLY** after the Engine is running and you are ready to move the T-bars.

**NOTE:** The Hand Brake is **NOT** intended to be used as a primary means of stopping Loader movement. The Hydrostatic Drive has enough torque to overpower the Hand Brake. **BE SURE** the Hand Brake is in the "disengaged" position whenever the Loader is being driven.

#### MECHANICAL LIFT CYLINDER LOCK (Figs. 6-3, 6-4 & 6-5)



**CAUTION:** BEFORE leaving the Operator's Compartment to work around the outside of the Loader with the Lift Arms raised, **ALWAYS** engage the Mechanical Lift Cylinder Lock. **BE SURE** also to engage the Hand Brake and remove the Ignition Key **BEFORE** leaving the Operator's Compartment.

The Mechanical Lift Cylinder Lock will hold the Lift Arms in the raised position and prevent accidental dropping if the Lift/Tilt T-bar is actuated or the hydraulic Hose connections are disconnected.

## Lock Engagement

To operate the Lock, first lower the Lift Arms into contact with the Loader Frame. Then, stop the Engine and turn the Ignition Key off and engage the Hand Brake. Next, leave the Operator's Compartment and pull the Pin which holds the Lock up against the Lift Arm and allow the Lock to come down into contact with the Lift Cylinder. Then, get back into the Operator's Compartment and restart the Engine. Next, operate the Lift/Tilt T-bar to raise the Lift Arms until the Lock drops over the end of the Lift Cylinder Housing and around the Cylinder Shaft. Then, carefully lower the Lift Arms just enough so that the Lock securely contacts the Rod end of the Lift Cylinder.

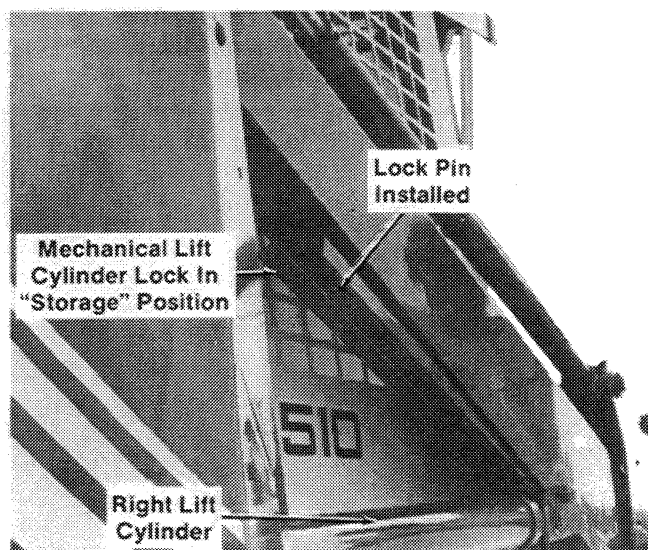


Fig. 6-3



Fig. 6-4

## Lock Disengagement

To return the Mechanical Lift Cylinder Lock to its "storage" position, first raise the Lift Arms completely. Then, stop the Engine and turn the Ignition Key to the "off" position. Then, before leaving the Operator's Compartment, check if the Lift Arms are held in the raised position by the Solenoid Holding Valve by pushing the Lift/Tilt T-bar forward. If the Solenoid Valve will **NOT** hold the Lift Arms in the raised position, do **NOT** leave the Operator's Compartment until the Lift Arms have been lowered or, have another person replace the Lock into the "storage" position for you. To store the Lock, raise it back up into contact with the Lift Arms and install the Lockpin thru the hole in the Lock Anchor Pin under the Lift Arm.



Fig. 6-5: Lift Arm Locked-up

## MATERIAL DENSITIES

The following Table lists densities for some common materials which can be carried in a Bucket. The densities listed are average values and intended only as a guide for Bucket selection.

**NOTE:** The SAE operating capacity of the SL4510 is 1150 lb (522 kg) and the SAE operating capacity of the SL4610 is 1225 lb (556 kg). To prevent exceeding the operating capacity of either model Loader, use the following table to calculate the weight of the load to be carried. Multiply the weight per cubic foot of material from the chart by the cubic foot capacity of the Bucket to obtain the specific weight of the load. For a material which is **NOT** in the chart, obtain its density value before selecting the appropriate Bucket.



**CAUTION:** NEVER exceed the rated operating capacity of either model Loader.

**Table of Common Material Densities in lb/cu ft\***

Materials	For 9.5 & 10.5 cu ft Buckets	For 13 cu ft Buckets	For 17 & 22 cu ft Buckets
Alfalfa Meal			17
Ashes			35 - 50
Barley			38
Bone Meal		60	
Bran			20
Brick-common	112		
Carrots			40
Cement	110		
Clay	80 - 100		
Concrete	115		
Corn-shelled			45
Corn-ear			28
Cotton Seed			25
Cinders			50
Coal-antracite	94		
Coke			30
Earth-loam dry		65	
Earth-loam wet	100		
Ensilage			36
Flax Seed			45
Fertilizer Blend		66	
Gravel-dry	90		
Gravel-wet	115		
Gypsum-crushed	95		
Lime		60	
Lime Stone	90		
Manure-dry			45
Manure-wet		65	
Milo			45
Oats			26
Onions			46
Peanuts-shelled			20
Phosphate-granular	90		
Potash		68	
Potatoes			48
Rice			48
Rye			44
Salt-dry	100		
Sand-dry	108		
Sand-wet	125		
Sand-foundry	95		
Shale-crushed	90		
Silage			40
Soybean Meal			40
Soybeans-whole			50
Sugar-granulated		55	
Sugar Beets			50
Sulpha Mag	95		
Taconite Pellets	107		
Wheat			48

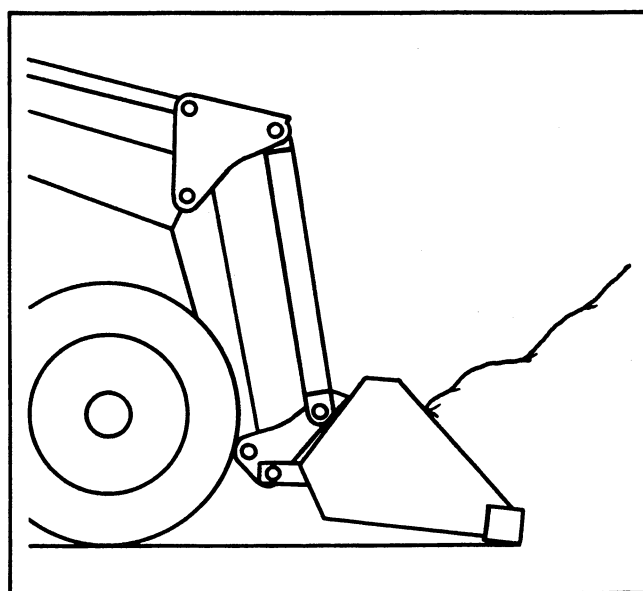
\*For kg / m<sup>3</sup>, Multiply lb/ft<sup>3</sup> x 16

## WORKING WITH LOADER

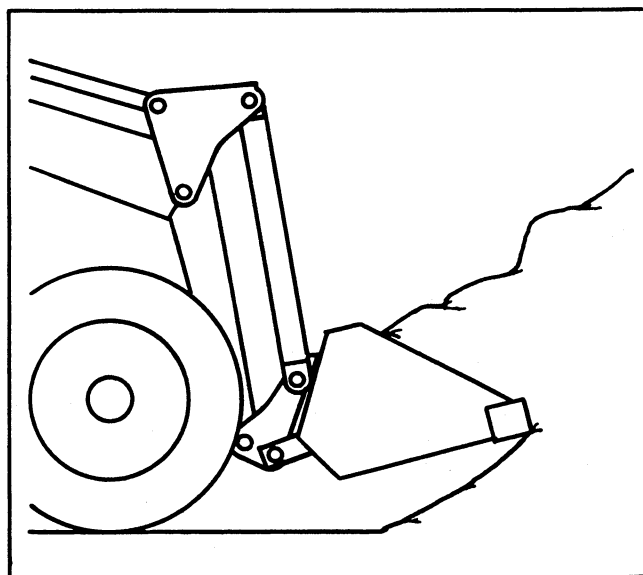
### Digging with and Loading a Bucket (Figs. 6-6, 6-7, 6-8 & 6-9)

To dig with and load a Bucket, first lower the Lift Arms down into contact with the Loader Frame and roll the Bucket Cutting Edge down into contact with the ground. Move the Loader into the material and, as the Engine loads-down, roll the Bucket back slowly and, at the same time, gradually pull back on the Propulsion T-bar to decrease your travel speed while still maintaining the Wheel torque.

**NOTE:** Loader working ability is increased when travel speed is decreased. To obtain maximum Wheel torque, move the Propulsion Control T-bar only a slight amount forward from its "neutral" position, while filling the Bucket.

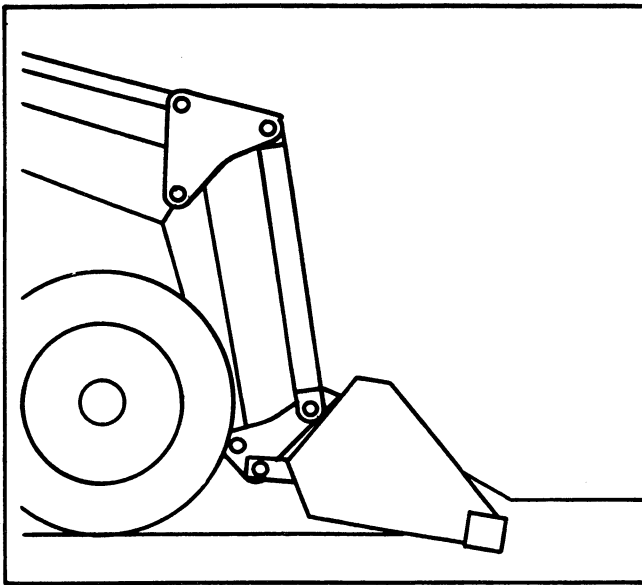


**Fig. 6-6**



**Fig. 6-7**





**Fig. 6-8**

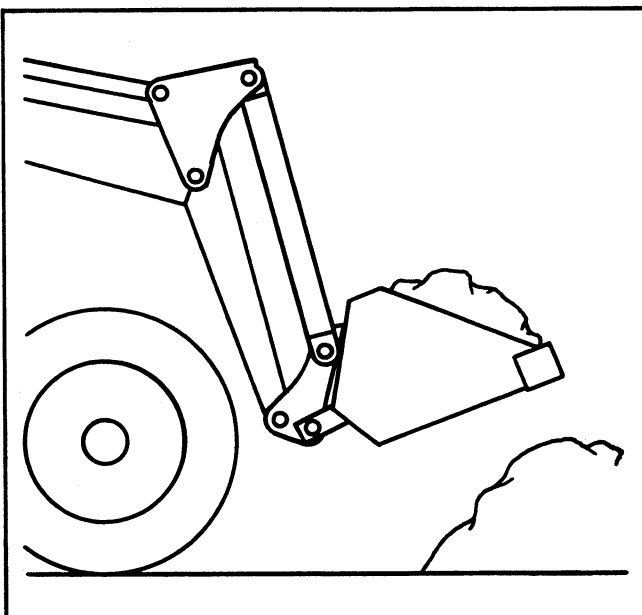
In most hard-packed materials, to fill the Bucket, it will be necessary to also raise the Lift Arms while rolling the Bucket back. Avoid driving onto the material, if at all possible. With the Bucket filled, back the Loader away from the material and rest the Lift Arms against the Loader Frame before proceeding to the dumping area.



**CAUTION: ALWAYS** carry a loaded Bucket or Fork **LOW** with the Lift Arms resting on the Loader Frame. For additional stability when operating on inclines or ramps, **ALWAYS** travel with the heavier end of the Loader in the same direction as the top of the incline.

### Dumping the Bucket or Fork

#### Onto a Pile



**Fig. 6-9**

Carry the loaded Bucket or Fork low until reaching the pile. Then, gradually slow-down to a creep or stop forward motion close to the point of dump and raise the Lift Arms high enough so that the Bucket or Fork clears the top of the pile. Then, slowly move the Loader ahead to position the Bucket or Fork to dump the material on top of the pile. Empty the Bucket or Fork and back the Loader away while lowering the Lift Arms and rolling the Attachment back.

#### Into a Box

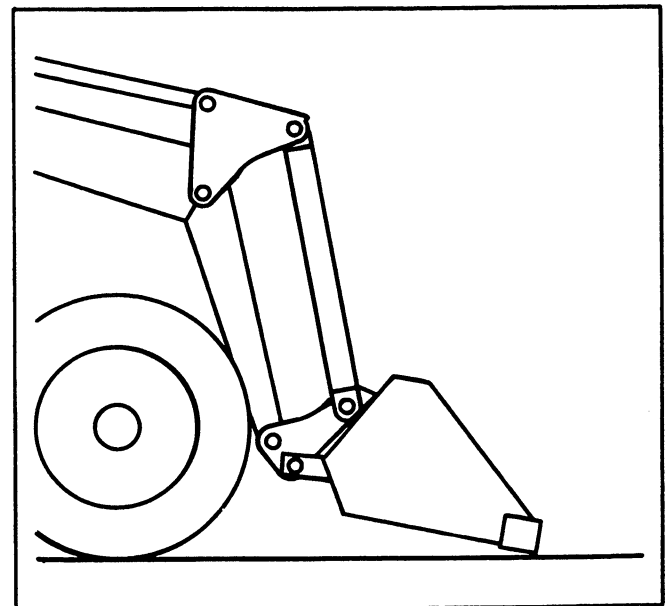
Carry the loaded Bucket or Fork low and approach the truck, trailer or spreader box squarely with the side of the box. Gradually slow-down to a creep or stop your approach as close to the side of the box as possible while still allowing clearance for raising the Lift Arms and loaded Bucket or Fork. Then, while stopped or slowly creeping forward, gradually raise the Lift Arms until the Attachment clears the top of the box and slowly move the Loader ahead to position the Bucket or Fork over the inside of the box. After the material is dumped, slowly back away from the box and lower the Lift Arms while rolling the Attachment back.

#### Over a Solid Embankment



**CAUTION: Do NOT** drive too close to an excavation or ditch; **BE SURE** the surrounding ground has adequate strength to support the weight of the Loader and the load.

Carry the loaded Bucket or Fork low while traveling toward the dumping area. Then, gradually creep forward and stop the Loader at the position where the Attachment extends half-way over the edge of the embankment. Then, roll the Bucket or Fork forward and raise the Lift Arms to dump the material. After the material is dumped, back away from the embankment slowly while lowering the Lift Arms and rolling the Attachment back.



**Fig. 6-10**

### Scraping with a Bucket (Figs. 6-10 & 6-11)

For scraping, the Skid Loader should be operated in the forward direction. First, position the Lift Arms down against the Loader Frame. Tip the Bucket Cutting Edge at a slight angle to the surface being scraped. While traveling slowly forward, with the Bucket in this position, material can flow over the Cutting Edge and collect inside the Bucket. Scraping can be done with Lift/Tilt T-bar in either the "neutral" position or the "float" position.

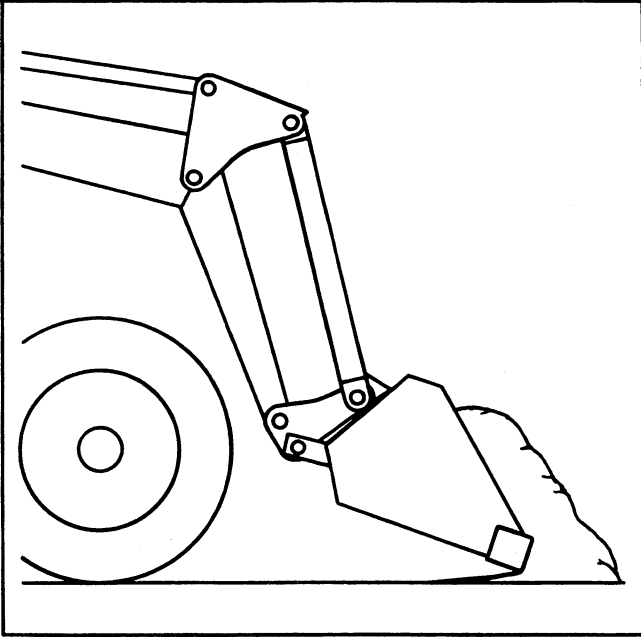


Fig. 6-11

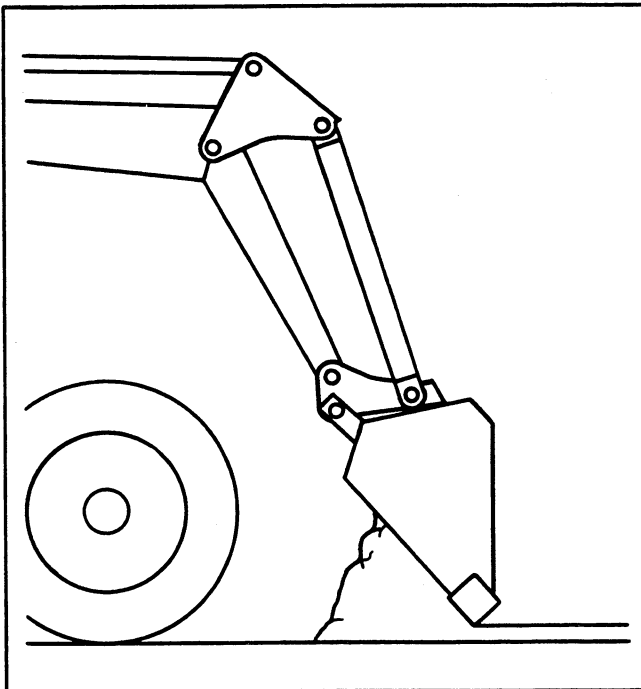


Fig. 6-12

### Leveling with a Bucket (Fig. 6-12)

First drive the Loader to the outer edge of the area to be leveled. Then, with the Lift Arms down against the Frame, push the Lift/Tilt T-bar into the "float" position and roll the Bucket forward to place the Bucket Cutting Edge at a 30° to 45° angle to the surface being leveled. Proceed to drive the Loader backwards dragging the dirt and, at the same time, leveling it.

The "float" (detent) position for the Lift/Tilt Control T-bar is reached by pushing the T-bar all the way forward. This T-bar position opens both work ports to the Reservoir and thus allows the Lift Arms to "float" while the Bucket follows the ground contour.



**WARNING: NEVER** push the Lift/Tilt Control T-bar into the "float" position with the Attachment loaded and the Lift Arms raised as this will cause the Lift Arms to drop.

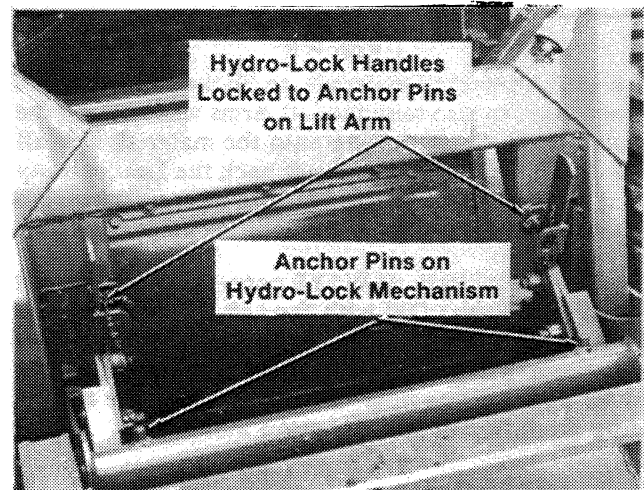


Fig. 6-13

### CHANGING ATTACHMENTS Figs. 6-13 & 6-14)



**CAUTION:** To prevent unexpected and undesired Attachment release from the Lift Arms, BE SURE to secure the Hydro-lock Handles to the Anchor Pins on the Hydro-lock Mechanism with Lockpins provided, BEFORE and while operating the Loader.

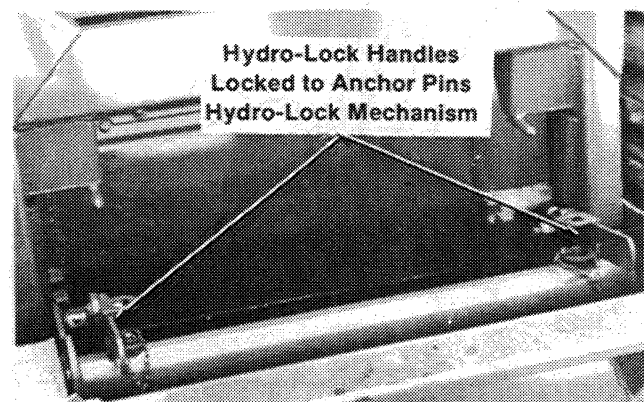



Fig. 6-14: Hydro-Lock Mechanism in Position to Engage Hooks on Back of Bucket

The Skid Loader features a Hydro-lock Latching and Locking Mechanism which enables use of the Loader hydraulics system (if desired) to hook-up or remove the Attachment (Bucket or Fork).

Before proceeding to attach a Bucket or Fork, make sure that the Hydro-lock Levers are locked to the Anchor Pins on the front of the Lift Arms with the Lockpins provided. Then, get into the Loader, start the Engine and make sure that the Lift Arms are lowered into contact with the Loader Frame. Next, line-up the Loader squarely with the back of the Attachment. Roll the Hydro-lock Mechanism forward until the Hydro-lock Pins are slightly below the mating Hooks on the back of the Attachment. Slowly drive the Loader forward while rolling the Hydro-lock back to engage the Attachment Hooks. Stop forward travel when the Hooks are engaged but continue to roll the Hydro-lock back to pick the Attachment up off the ground. When the Hydro-lock is rolled-back completely, the lower portion of the Attachment will also seat into the mating Yokes on the Hydro-lock Mechanism. Exercise the **MANDATORY SAFETY SHUTDOWN PROCEDURE** (page 8) and get out of the Loader.

With the Loader Engine OFF, leave the Operator's Compartment, remove the Lockpins and rotate the Hydro-lock Levers so that they engage the Anchor Pins on the Hydro-lock Mechanism. Then, reinstall the Lockpins to secure the Attachment. **BE SURE** that Cams are correctly adjusted to firmly lock the Attachment. When properly adjusted, Cams should contact the front of the Bucket Hooks. If they do **NOT**, readjust the Cams per details under the Hydro-lock Levers topic in the Adjustments chapter.

**NOTE:** Periodically check the Hydro-lock Levers to insure that they rotate freely and that they properly engage the Anchor Pins, in both the "locked" and "storage" positions, so that the Lockpins can be installed. As necessary, straighten, replace or reshim the Lever(s) to regain correct alignment. Frequent lubrication will help to maintain freedom of rotation.

 **CAUTION:** Do NOT use a steel-head hammer or other metal object to strike against the Lever(s) as this may cause injury from flying metal.

To remove the Attachment, first remove the Lockpins from the Anchor Pins on the Hydro-lock Mechanism. Then, rotate the Levers so that they engage the Anchor Pins on the front of the Lift Arms. Next, install the Lockpins to secure the Levers to the Lift Arms. Then, get into the Loader and start the Engine. Roll the Hydro-lock Mechanism far enough forward so that the Hooks on the back of the Attachment are released by the Hydro-lock Pins on the Lift Arms. Next, slowly back the Loader away from the Attachment.

Refer to the preceding information for the hook-up sequence if another Attachment is going to be put on immediately.

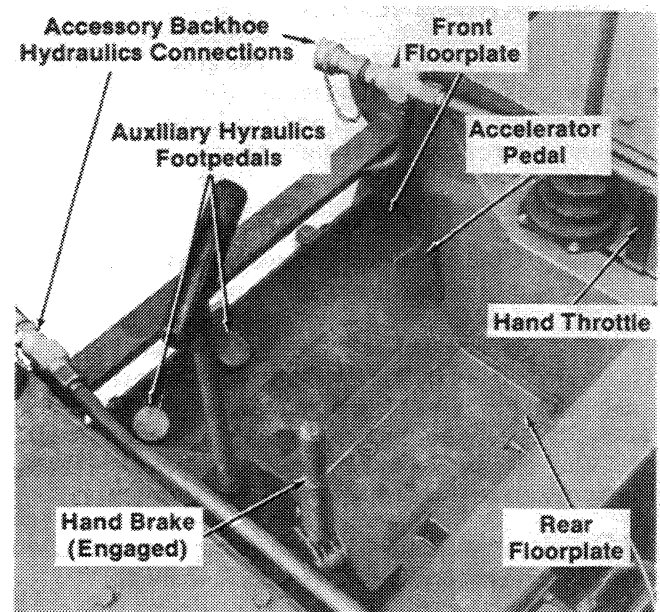


Fig. 6-15

#### AUXILIARY FRONT HYDRAULICS (OPTIONAL) (Fig. 6-15 & See Fig. 6-13)

A Skid Loader which is equipped with an optional factory or field installed Auxiliary Front Hydraulics system has Male and Female Quick-disconnect Fittings for convenient hook-up to the appropriately terminated hose connections of an accessory hydraulically operated device, such as a Grapple Fork. Operation of the Auxiliary Flow Control Valve is controlled by Footpedals which are protruding through access holes in the Front Floorplate. Pushing down on the Left Pedal causes flow through the Valve in the direction of the Male Quick-disconnect and pushing down on the Right Pedal causes flow through the Valve in the direction of the Female Quick-disconnect. When there is **NO** hose coupling made to both Quick-disconnects and the Footpedals are actuated, the main System Relief Valve will operate to bypass the Auxiliary Hydraulics system.

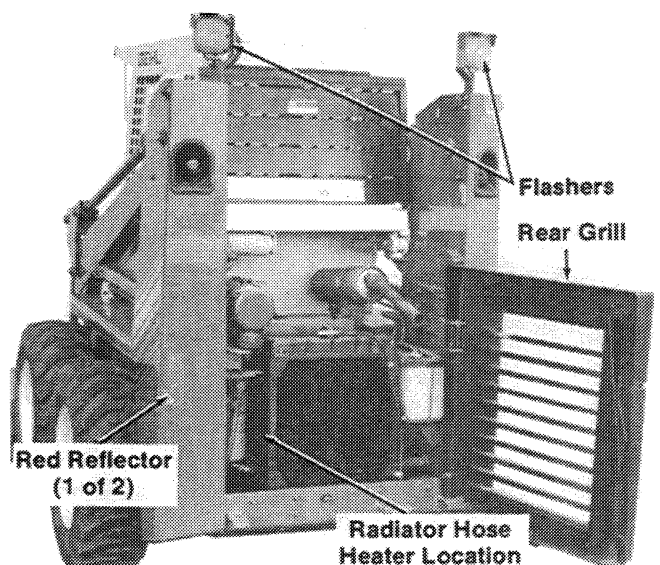


Fig. 6-16

### RADIATOR HOSE HEATER (Fig. 6-16)

The Radiator Hose Heater is designed for starting assistance, in below freezing temperatures, by warming-up the cooling system fluid and the Engine block. The Heater is designed for all night operation (if desired), however, 2 to 4 hours is usually sufficient time to warm the coolant for starting assistance.



**CAUTION: BEFORE plugging the Line Cord into a 120 volt, 60 hz power source, BE SURE the Loader Attachment (Bucket or Fork) is in contact with the ground and that the Ignition Key is in the "off" position. Likewise, disconnect the Line Cord from the power source, BEFORE proceeding to start the Loader Engine. NEVER attempt to use the Heater unless the Radiator is filled to the proper level with coolant.**

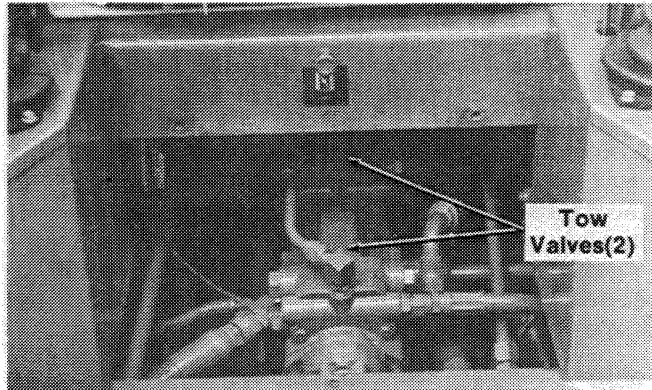
**NOTE:** When NOT being used, the Line Cord can be conveniently removed and stored.

### TOWING & HIGHWAY TRAVEL (Figs. 6-16 & 6-17)

The SL4010 Series Skid Loaders are equipped with Emergency Hydrostatic Lockouts for use if the Loader becomes disabled and requires a tow. Access to the Lockouts is gained by temporarily removing the Rear Floorplate.

**NOTE:** If the Loader is to be towed behind another vehicle, **BE SURE** to turn the Lockout Valves on both Hydrostats. **BE SURE** also that Lockouts are restored to their original positions immediately after towing is completed. **Do NOT** exceed a maximum towing speed of 2mph (3.2kmh).

For short distance highway travel, use the SMV Emblem Mounting Bracket to attach an SMV Emblem (purchased locally). A Loader which is used frequently on the highway should be equipped with a Work & Warning Light Kit.



**Fig. 6-17: Tow Valve Location with Rear Floorplate Removed**

# CHAPTER 7

## ADJUSTMENTS



**CAUTION:** BEFORE proceeding to perform any adjustments on the Skid Loader, exercise the **MANDATORY SAFETY SHUT-DOWN PROCEDURE** (page 8).

### LOADER RAISING PROCEDURE (Fig. 7-1)

Whenever it becomes necessary to raise the Loader, so the Wheels are **NOT** contacting the ground, the mounted Bucket and Lift Arms can be used to pick the Loader up off its Tires and Wheels.



**WARNING:** The procedure below, for raising the Loader, **MUST** only be used to do just that. Do **NOT** leave the Operator's Compartment with the Engine running and the Loader in the "raised" position. Shut off the Engine and carefully climb out of the Operator's Compartment, making sure as to avoid disturbing the Lift/Tilt Control T-bar while getting out of the Loader. Once out of the Operator's Compartment and **BEFORE** proceeding to work on the Loader, carefully and properly install additional blocking and supports under both front and back ends of the

Loader. Do **NOT** rely on the Loader Hydraulics system to maintain the "raised" position without additional blocking and supports.

**Raising** the Skid Loader can be conveniently accomplished by first placing two equal height (approximately 8-1/2" tall) solid blocks of wood (at least 2 feet long) parallel (but **NOT** in contact) with the rear Wheels and centered under the horizontal portions of the rear of the Loader Frame. Then, climb into the Operator's Compartment, fasten your Seat Belt, start the Engine and raise the Lift Arms to the necessary height to allow the Bucket to be rolled-forward so that the Cutting Edge is straight and perpendicular to the ground. Next, lower the Lift Arms while making sure that the Bucket Cutting Edge clears the Tires. Slowly lower the Lift Arms and, in turn, raise the Loader up until all four Tires are off the ground. Then, shut off the Loader Engine and climb out of the Operator's Compartment, making sure **NOT** to disturb the Lift/Tilt Control T-bar. Once out of the Loader, carefully and properly install additional blocking and supports under the front of the Loader before proceeding to perform service or adjustments with the Engine running.

To take the Loader back out of the "raised" position, reverse the "raising" sequence.

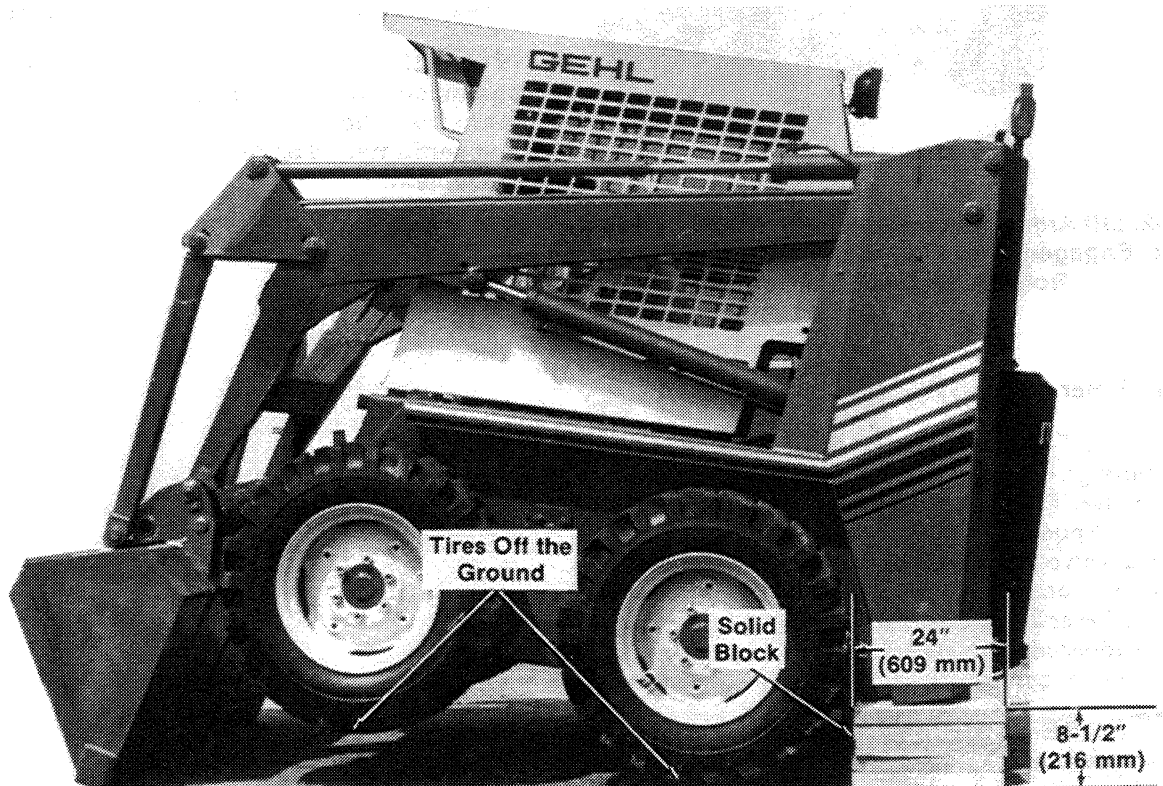


Fig. 7-1

## CONTROL T-BARS (Figs. 7-2 thru 7-5)

Both Control T-bars are factory adjusted for proper operating characteristics and should require **NO** further readjustment unless Linkages have to be disturbed from their original factory set positions. The Rear Floorplate and respective Right (Lift/Tilt) or Left (Propulsion) T-bar Consoles will have to be removed for access to the appropriate Linkage Rods or Ball Joints. The Overhead Guard can be unbolted, rolled-back and locked-out of the way for additional adjustment access, when desired.



**Fig. 7-2: Lift Arms Raised, Mechanical Lift Cylinder Lock "Engaged" and Overhead Guard Unbolted Rolled-back and Locked**

### Lift/Tilt T-Bar (Fig. 7-3)

The Lift/Tilt T-bar has two Ball Joints which are connected through Control Rods to the Spools of the Main System Valve. The Lift Control Rod is coupled directly to the Lift Spool. The Tilt Control Rod is connected through a Valve Lever to the Tilt Spool. If the Control Rods have to be uncoupled from the Lift Spool or the Tilt Valve Lever and are later replaced, the Rod lengths can be readjusted, if necessary, into or out of the Ball Joints before opposite ends of the Rods are reconnected.

**NOTE:** **BE SURE** that, anytime the Linkage Rods are removed, replaced and readjusted, the Locknuts are tightened against the Ball Joint connectors to fix the positions of the Rods.

## Propulsion T-Bar (Fig. 7-3)

Three separate adjustments are possible to restore proper Propulsion Control T-bar operation. All three adjustments are made at the factory and should require **NO** additional readjustment unless linkages have to be disturbed from their original factory settings.

### Control Arm Cams

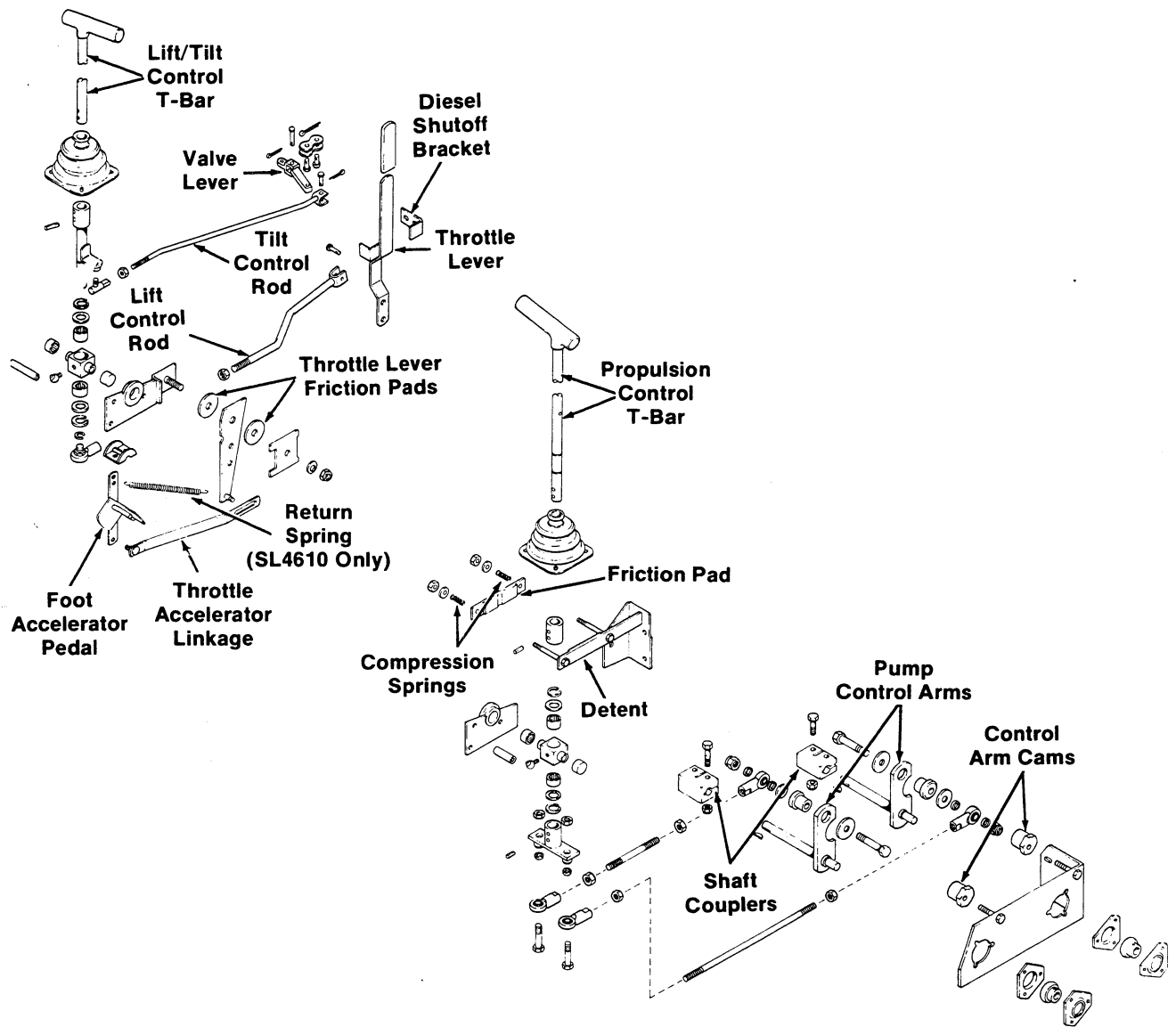
Cam assemblies are provided on both Hydrostatic Pumps to limit the strokes of the Control Arms which, in turn, governs forward movement of the Loader. Each Cam can be independently adjusted to limit the Control Arm stroke so as to prevent distortion of the Pump's internal Cam Plates and to equalize the oil flow through each Pump so that the Loader travels as straight as possible when the Propulsion T-bar is moved forward to the full-stroke position.

**NOTE:** The Stop Cams are factory set and should only be adjusted by (or under the direction of) your GEHL dealer.

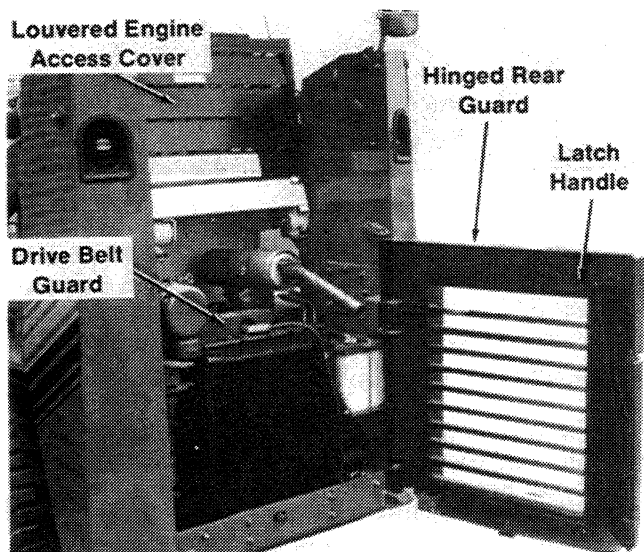
### Detent

Friction Strips are provided for the T-bar assembly. Pressure on the Strips is controlled by Compression Springs on both ends of the Strips. The notch in the Friction Pad opposite the flat surface locates forward and backward centerpoint of the Handle movement. Whenever the Detent is adjusted or whenever the "neutral" for the Propulsion Control is reestablished, **BE SURE** that both centerpoints are accurately established.

**NOTE:** The Friction Pad Compression Springs should only require readjustment to eliminate chatter in the T-bar. Likewise, the Springs should **NOT** be overtightened and thus restrict the T-bar Handle movement.



**Fig. 7-3: T-Bars, Accelerator & Throttle (Exploded View)**



**Fig. 7-4**



## Linkage Rods

Right-hand and left-hand threads are provided on the ends of the Linkage Rods which connect the Ball Joints on the end of the Propulsion Control T-bar to the Ball Joints on the Control Arms attached to the Hydrostatic Pumps. By loosening the Locknuts and rotating the Rods, with the T-bar in "neutral" detent, the Control Arms can be readjusted until the Wheel rotation stops. This Rod adjustment should be made with the Loader raised-up so that Tires are **NOT** touching the ground. Refer to the Loader Raising Procedure in the beginning of this chapter for the correct procedure to follow for raising the Loader off the ground.

## ENGINES

The SL4510 (Gasoline) and SL4610 (Diesel) powered Skid Loaders are furnished with respective Engine Manuals. Refer to the Engine Manual for all Engine related specification, adjustment, maintenance and service information.

### BELTS - ALTERNATOR & GOVERNOR (Fig. 7-4)

Access to the Belt(s) is obtained by opening the Louvered Engine Access Cover and by unlatching and swinging-open the Hinged Rear Guard. Drive Belt tension should be checked and readjusted if necessary after every 100 hours of operation.

#### Alternator

The Alternator is mounted on a pivot and secured in a slotted Adjustment Bracket. To adjust Belt tension, first loosen (but do **NOT** remove) the Pivot Bolt. Then, loosen the Bolt in the slotted Bracket slightly and pry against the Alternator to reposition it. Proper tension is adjusted by obtaining approximately a 1/4" (6 mm) deflection of the Belt at the midpoint between the Sheaves when a 4 lb (1.8 kg) force is applied. After proper tension is adjusted, tighten both the Bolt in the slot and the Pivot Bolt.

#### Governor (SL4510 Only)

**NOTE:** The Governor is only provided on the Loader model with Gasoline Engine. Access to the Belt Idler is gained by removing the Belt Guard which is attached to the Radiator.

An Idler Sheave, mounted in a slotted Bracket, is provided for Drive Belt tension adjustment. Proper tension is adjusted by obtaining approximately a 1/4" (6 mm) deflection on the strand of Belt opposite the Idler Sheave when a 2 lb (0.9 kg) force is applied. After proper tension is adjusted, tightly secure the bolt which holds the Idler in the slot.

### DRIVE CHAINS (Fig. 7-5)

Skid Loader Drive Chain tension should be checked and readjusted initially after the first 50 hours of operation and thereafter following every 200 hours of operation. To adjust Chain tension, on either side of the Loader, the procedure is the same. First, unbolt, roll back and lock the Overhead Guard. Then, remove and retain the

Chain Housing Access Cover to observe tension adjustment on either side, as appropriate. The Loader can be left on its Tires to make the Chain tension adjustment.

To adjust the tension, proceed as follows:

1. Loosen (but do **NO** remove) the (4) Nuts which secure the Hydraulic Motor Mounting Plate and withdraw the Adjustment Screw enough to allow full travel of the Plate.
2. Loosen (but do **NOT** remove) the (8) Nuts which hold the Jackshaft in position. In addition, loosen (but do **NOT** remove) the Locknuts on the Takeup Plate Cams.
3. Rotate the Adjustment Screws on the Takeup Plates clockwise until a maximum deflection of approximately 1/4" (6 mm) for about 20 lb (9 kg) of force is obtained for each of the secondary Drive Chains. Tighten the Adjustment Screws equally in order to square the Jackshaft Sprocket vertically inside the Housing. Tighten or loosen the Cams (as necessary) to adjust the Jackshaft Sprocket horizontally inside the Housing.
4. Tighten the Adjustment Screw on the Motor Mounting Plate until a maximum deflection of approximately 1/4" (6 mm) for about 20 lb (9 kg) of force is obtained for the primary Drive Chain.

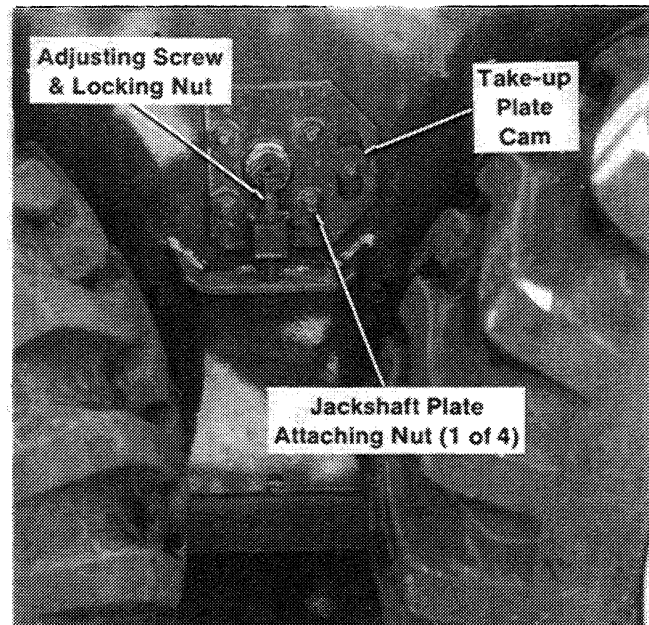


Fig. 7-5

5. After the proper Chain tension is obtained, retighten the (4) Nuts on the Motor Mounting Plate, replenish the oil level (so that it is about 1" deep) and replace Access Cover after Chain adjustment is completed.

### HAND BRAKE (Fig. 7-6)

Hand Brake is linked by Cables to Disc Brake assemblies on each Hydrostatic Drive Motor Sprocket. The end of the Brake Handle can be rotated to remotely adjust the Cable lengths and, in turn, the Brake mechanisms. After every 200 hours of operation, Hand Brake function should be checked and the Brakes adjusted by rotating the end of the Brake Handle.



After numerous adjustments, the end of the Handle will become rotated to its travel limit and **NO** longer affect Brake adjustment. At this time, the end of the handle should be turned back to the opposite end of its rotation limit and the Adjustment Screw on each Brake assembly **MUST** be readjusted. Access to the Adjustment Screw for each Brake is gained by removing the Access Cover on the outside of the Chaincase. In addition, the front Wheels should be removed for better access to the Access Covers. **BE SURE** to readjust the Handle before proceeding to adjust the Screw on the Disc Brake assembly. To adjust the Screw, first loosen the Locking Nut. In addition, after the Screw is adjusted, retighten the Locking Nut. After about two adjustments on the Brake assembly Adjustment Screw, the Pads on the Disc Brake mechanism will require replacement.

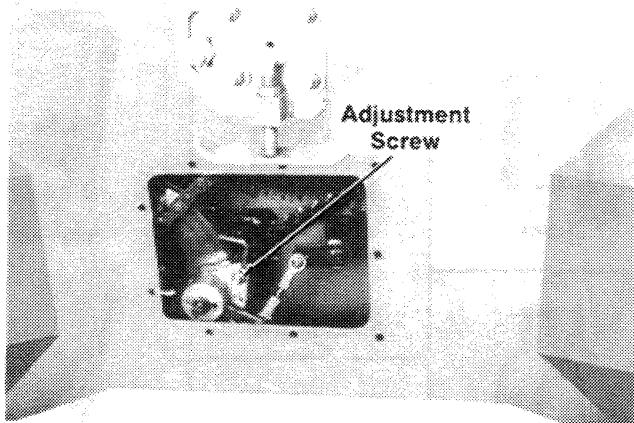


Fig. 7-6

#### HYDRO-LOCK LEVERS (Fig. 7-7)

The Hydro-lock Latching and Locking Mechanism for Attachment mounting has adjustments on both sides to enable repositioning the Catches to help eliminate looseness due to normal wear. To make the Catch adjustment, first attach the Bucket or Fork. Then, after exercising the **MANDATORY SAFETY SHUTDOWN PROCEDURE** (page 8), loosen the (2) Catch mounting bolt fasteners slightly. Next, with the fasteners loosened slightly, pry against the top of the Catch to force it down against the Latch Pin. Then, with pressure being applied, retighten the fasteners to a torque of 110 to 115 ft-lb (149 to 156 N-m). Repeat this procedure for the other Catch.

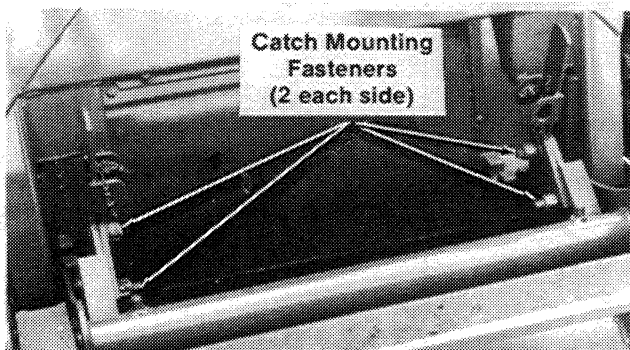


Fig. 7-7

#### THROTTLE & ACCELERATOR (Fig 7-8 & See Fig. 7-3)

SL4010 Series Skid Loaders are equipped with a right hand-operated Throttle Lever and a right foot-operated Accelerator Pedal. The Throttle Rod, used to interconnect the Accelerator Pedal to the Governor on a Gasoline Engine model Loader or to the Injection Pump on a Diesel Engine model Loader, is threaded on both ends and coupled by Ball Joints. The Rod length is factory set and requires **NO** further readjustment, except if the Linkage Rod had to be removed for service. Access to the Accelerator and Throttle Lever linkage is gained by removing the Lift/Tilt T-bar Console. Access to the Governor or Injection Pump linkage is gained by unbolting, rolling-back and locking the Overhead Guard. **BE SURE** to retighten the Locking Nuts to fix the Linkage Rod length, after any adjustments have been made.

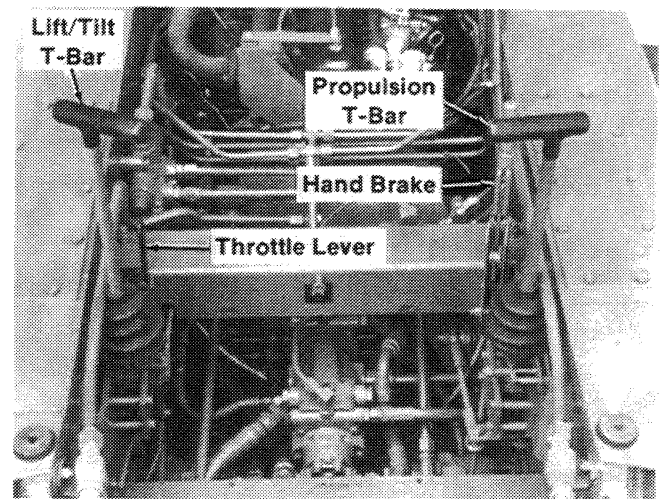



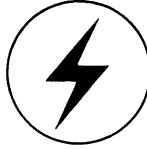





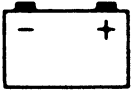




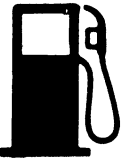































Fig. 7-8: T-Bars, Throttle & Accelerator Linkage Rod Access

Besides the Throttle Rod linkage adjustment, a Friction Pad pressure adjustment is also provided at the base of the Hand Throttle Lever. The pressure may have to be readjusted if the Lever does **NOT** hold its position. Access to the pressure adjustment is gained by removing the Lift/Tilt T-bar Console.

On a Loader with Diesel Engine, an additional non-adjustable Linkage Rod is provided between the Throttle Lever and the Shut-off Lever on the Injection Pump. With periodic lubrication, the Shut-off Rod and linkage require **NO** other adjustment or service.

# International Symbols Explanation

					
STARTER	IGNITION ON	ALL POWER OFF	POWER ON ACCESSORIES	WORK LIGHT	EMERGENCY OR HAZARD FLASHER
					
HORN	ENGINE OIL PRESSURE	ENGINE HOURS (Running Time)	AMMETER OR GENERATOR LIGHT	HEATER STARTER	FUSE
					
ENGINE COOLANT TEMPERATURE	Full	Gasoline	CHOKE	HYDRAULIC RESERVOIR	Engaged
					
CAUTION: PRESSURIZED RADIATOR	1/2 Full	Diesel	ENGINE OIL	DIRECTION OF CONTROL LEVER	Disengaged
					Empty
Fast	Empty	FUEL	ROTATE CLOCKWISE	Float	
					NEUTRAL
Slow	NEUTRAL	ROTATE COUNTERCLOCKWISE	FUEL SHUT-OFF	Lower	
					REVERSE
REVERSE	FORWARD	BUCKET CONTROL	Roll Back	Raise	
					COOLANT
COOLANT	GREASE	DIPSTICK	BUCKET CONTROL	LIFT ARM CONTROL	

2. Preassemble the Quick-disconnect fittings to the Inside and Outside Auxiliary Hydraulic Tube Hoses.
  - a. Attach the Cap (073405) and Plug (073404) to the respective Male (073403) and Female (073402) Quick-disconnect Fittings.
  - b. Assemble the Rings (on the Chains of the Cap and Plug) over the ends of the (2) Straight Male JIC Adapters (054850) and attach the Adapters to the Quick-disconnects using pipe sealing compound.
  - c. Connect the Male Quick-disconnect Fitting to the shorter Inside Hose Tube (074249). Connect the Female Quick-disconnect Fitting to the longer Outside Hose Tube (074250).
3. After step 2 is completed, properly orient the Inside and Outside Auxiliary Hose Tubes on the left Lift Arm and route the Hoses down the inside walls of the left Riser. Loosely anchor the Tubes to the top surface of the Lift Arm in the positions shown using (2 each) Clamps (059453) and 3/8 x 1-1/2 TFS and two Clamps (056773) and a 3/8 x 1-1/2 TFS.
4. After the Clamps are installed, tightly secure the mounting hardware and replace the Upper Link and left Tilt Cylinder assembly (removed in step 1).
5. After the Hose Tubes and Quick-disconnects have been installed, the Lift Arms should be raised and the Lift Arm Lock engaged. Then, unbolt, roll-back and lock the Overhead Guard. Next, unbolt and remove the Front and Rear Floorplates. Remove also the Hole Plugs from the Pedal Access Holes in the Front Floorplate.
6. Attach the Pressure Tube (075247) to the Hose end of the Outside Tube (075250) and the Drain Tube (075248) to the Hose end of the Inside Tube (075249).
7. Install the Clamp Support (075251) to the Riser using the existing 5/8 N as shown. Then, anchor the Inside Tube to the Clamp Support with a Clamp (056773) and a 5/16 x 7/8 CS, L and 2P.
8. Orient the Pressure and Drain Tubes as shown and anchor them against the Isolator Pad (075194) and to the 3/8 Stud on the Chassis using the Clamp (059453), L and N.
9. Preassemble and secure the (2 each) 90° Male JIC Adapter (054856) and (2 each) 45° Male Pipe JIC Elbows (065102) to the Auxiliary Valve (051392). **BE SURE** that the Fittings are oriented as shown in the drawing before they are tightly secured.
10. Properly orient and secure the Valve (051392) to the bracket on the Loader, in the position shown, using (3 each) 3/8 x 2-1/4 CS, N, L and P.
11. Insert the Pivot Bearing (075238) thru the hole in the Valve Lever (075239) and secure the Lever to the bracket on the Loader with a 3/8 x 1-1/4 CS, N, L and P. Then, install the Pivot Bushing (075237) into the slot in the Lever and secure it to the Valve with 2P and a LN.
12. Preassemble a Union Straight Thread Tee (064669) onto the Tube end of each Auxiliary Hydraulic Tube Hose (075253). Preassemble a JIC Cap Nut (075236) onto the leg of each Tee. **BE SURE** that the capped legs of the Tees are facing the rear of the Loader when the connections are tightened.
13. Route the Tube Hoses and connect the open end of each Tee to the Drain Tube (075248) and the Pressure Tube (075247).
14. Attach the Drain-connected Hose end of the one Tube Hose to the lower 45° Elbow and the Pressure-connected Hose end of the other Tube Hose to the upper 45° Elbow.
15. Properly orient (as shown) the Auxiliary Valve Pressure Tube (075246) and attach it to the 90° Male JIC Adapter on the right side of the Auxiliary Valve. Similarly, properly orient and attach the Auxiliary Valve Drain Tube (075252) to the 90° Male JIC Adapter on the left side of the Valve.
16. Attach and loosely secure the JIC Male Connector (056087) onto the other end of the Pressure Tube (075246) and attach the Swivel Elbow (075235) onto the other end of the Return Tube (075252).

**NOTE:** After step 16 is completed, the Auxiliary system is ready to be connected to the Main System Valve. To minimize oil loss, make the following connections as quickly as possible.

17. Quickly remove the JIC Cap Nut from the existing Tee Fitting on the Main System Valve and connect the Swivel Elbow to the Tee to complete the Return line connection to the Loader hydraulics system.
18. Quickly remove the Plug from the Main System Valve and in its place install the Power Beyond Sleeve (051393). Then, connect the JIC Male Connector into the other side of the Power Beyond System to complete the Pressure line connection to the Loader hydraulics system.

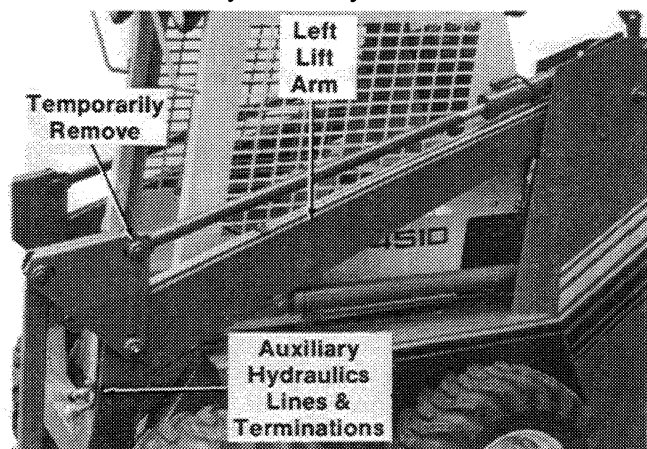


Fig. 9-2

**NOTE:** After the connections of steps 17 and 18 have been made, lower the Overhead Guard and start the Loader to check for leaks. **BE SURE** to replenish or replace the oil supply before starting the Loader Engine. Identify and rectify any problems before resecuring the Overhead Guard.

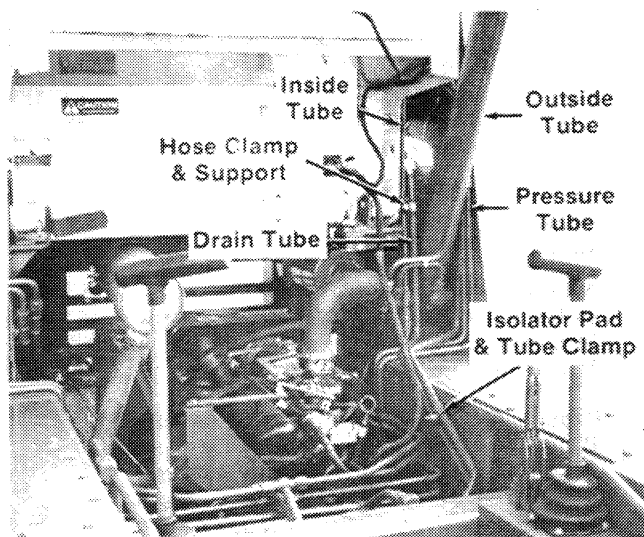


Fig. 9-3

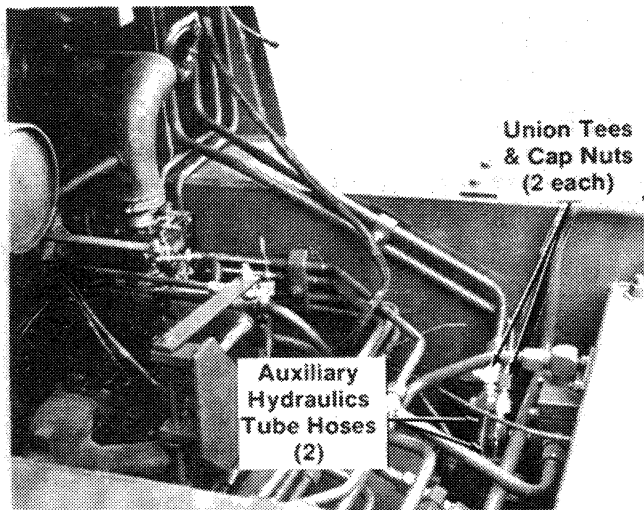


Fig. 9-4

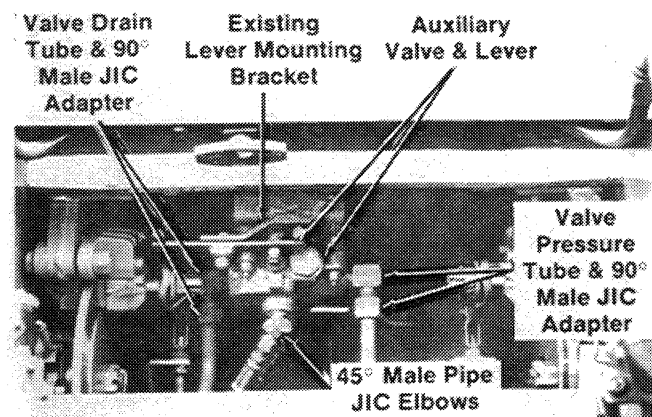


Fig. 9-5: Front & Rear Floor Plates Removed

19. After the system has been checked-out, reinstall the Front and Rear Floorplates and attach the two Footpedals (075243) onto the threaded studs of the Valve Lever to complete the installation.

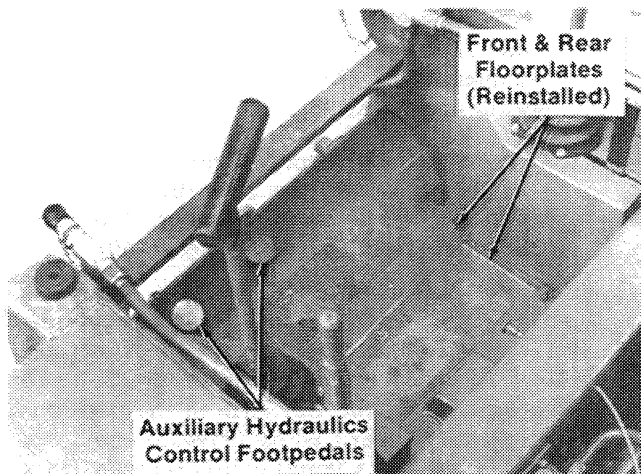


Fig. 9-6

#### WORK & WARNING LIGHT KIT (Field Installation) (Figs. 9-7 thru 9-11)

The Work & Warning Light Kit contains a Light Switch, a Lighting Wire Harness, two Headlight assemblies, a Work/Tail Light assembly, two Flasher Light assemblies, a Flasher and Mounting Bracket and attaching hardware. Remotely mounted Work/Tail Light and Flasher Lights interconnection wires are already provided in the Loader's Main Wire Harness between the Overhead Instrument and Control Panel and the Engine area. Installation of the Light Kit is as follows:

1. Temporarily remove the Main Wire Harness Trough which protects the Main Wire Harness along the inside left corner of the Overhead Guard. Then, detach the Overhead Instrument and Control Panel by removing the (5) 1/4 x 3/4 STHMS. Once the Panel is detached, carefully lower it and turn it around for access to the wiring on the back.

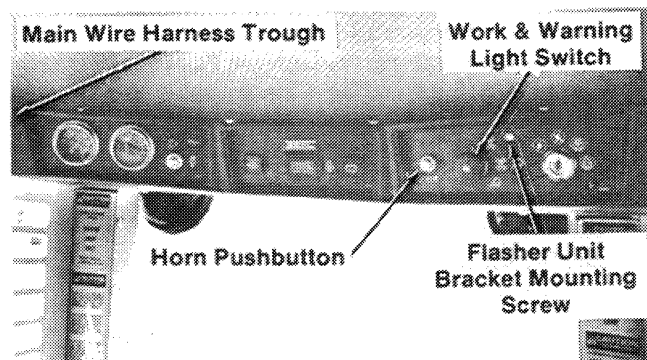


Fig. 9-7: Overhead Instrument & Control Panel (Installed)

# CHAPTER 8

## LUBRICATION

### GENERAL INFORMATION



**CAUTION:** NEVER attempt to lubricate the Skid Loader with the Engine running. ALWAYS BE SURE to exercise the **MANDATORY SAFETY SHUTDOWN PROCEDURE** (page 8) BEFORE proceeding to lubricate the Loader.

**NOTE:** The Maintenance chapter has provisions for recording dates of lubrication; use the spaces provided to log lubrication at specified intervals.

It is well to remember that a sufficient amount of oil or grease will prevent excessive part wear and early failure.

### OILS

Loader and Engine operation greatly depends on correct grade, good quality lubricating oils. In addition to the following information, refer also to your separate Engine Manual (provided) for specific quantities, grades and ratings spelled-out by the Engine manufacturer.

The **Drive Chain Cases** each require 1 U.S. gallon (3.8 liters) of multiviscosity (or equivalent good quality) motor oil. This quantity of oil should be maintained at all times. After every 500 hours of operation or annually, the oil in both Chaincases should be drained and new oil should be installed; refer to the Service chapter for draining and refilling details.

The **Engine Crankcase Oil and Filter** service information is found in the separate Engine Manual provided. Depending on your model Loader and seasonal temperatures, refer to appropriate oil recommendations in the Viscosity Charts provided.

The **Hydraulic Reservoir** for the Hydrostatic and Hydraulic systems of the Loader has a capacity of 14 U.S. gallons (53 liters). Use Automatic Transmission Fluid - Type A (suffix A), Type F or Dexron Automatic Transmission Fluid, or equivalent Hydraulic Fluid which meets characteristics specified in the Hydrostatic Fluid Viscosity Chart provided. After every 500 hours of operation or annually, the oil in the Hydraulic Reservoir should be drained and new oil should be installed; refer to the Service chapter for draining and refilling details.

**NOTE:** Besides the various oil level checks and replacements on the Loader and Engine, **BE SURE** to apply a few drops of oil to all **Linkage Ball Joints** after every 200 hours of operation or every 6 months.

### SL4510 (GASOLINE) ENGINE OIL VISCOSITY INDEX (Per API Specifications)

Temperature in F (C)	10 (-12) & Above	Below 10 (-12)
Viscosity (Type SD or SE)	10W-30, 10W-40 or 30W	5W-30 or 20W

### SL4610 (DIESEL) ENGINE OIL VISCOSITY INDEX (Per API Specifications)

Temperature in F (C)	10 (-12) & Above	Below 10 (-12)
Viscosity (Type CD or SC)	30W, 10W-30 or 10W-40	10W, 5W-20 or 5W-30

### HYDROSTATIC OIL VISCOSITY INDEX (VI level 150 - 200 per SUS Specifications)

Temperature in F (C)	0 (-18)	100 (38)	210 (99)
Viscosity	6000 Maximum	180 Minimum	47 Minimum

## GREASING

**NOTE:** Grease all fittings at the intervals of operation listed. Use a good grade of Lithium base grease.

Wipe dirt from the fittings before greasing to prevent the dirt from being forced into the Bearing or pivot. Replace any missing fittings, when noted. Force the grease into the fitting until it comes out at Bearing Seal or at Shaft. To minimize dirt build-up, avoid excessive greasing.

### Grease Fitting Locations

**NOTE:** All fittings listed should be understood as provided on both the right side and the left sides of the Loader when the term "(each side)" accompanies the location description.

#### Lubricate Every 10 hours (or daily)

1. Hydro-lock Lever Pivot (each side)
2. Hydro-lock Mechanism Pivot (each side)
3. Leveling Link (2 places each side)
4. Tri-link Pivot (each side)
5. Tilt Cylinder Front Pivot (each side)
6. Lift Cylinder Front Pivot (each side)
7. Tilt Cylinder Rear Pivot (each side)
8. Lift Arm Rear Pivot (each side)
9. Lift Cylinder Rear Pivot (each side)

#### Lubricate Every 100 hours

10. Lift/Tilt T-bar Pivot \*
11. Propulsion T-bar Pivot \*

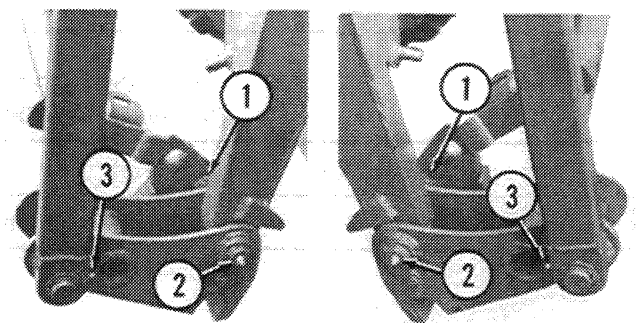
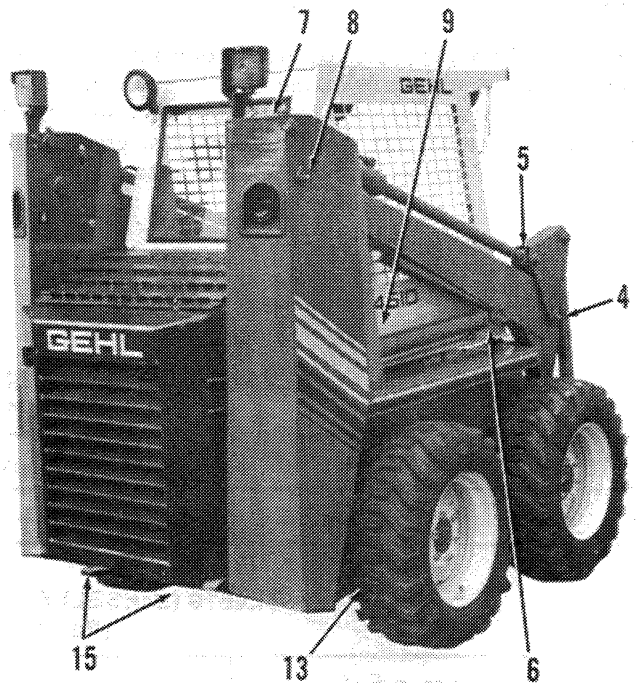
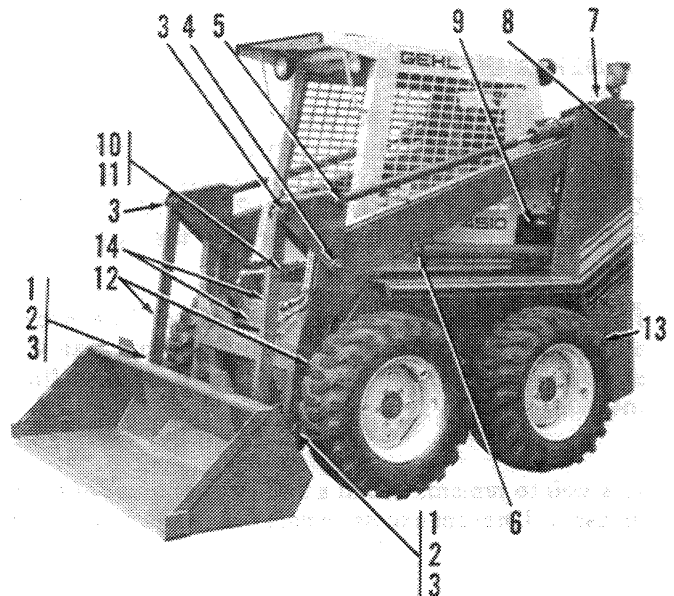
#### Lubricate Every 500 hours (or once annually)

12. Front Outside Wheel Bearing (each side)
13. Rear Outside Wheel Bearing (each side\*\*)
14. Front Inside Wheel Bearing (each side \*\*\*)
15. Remote Rear Inside Wheel Bearing

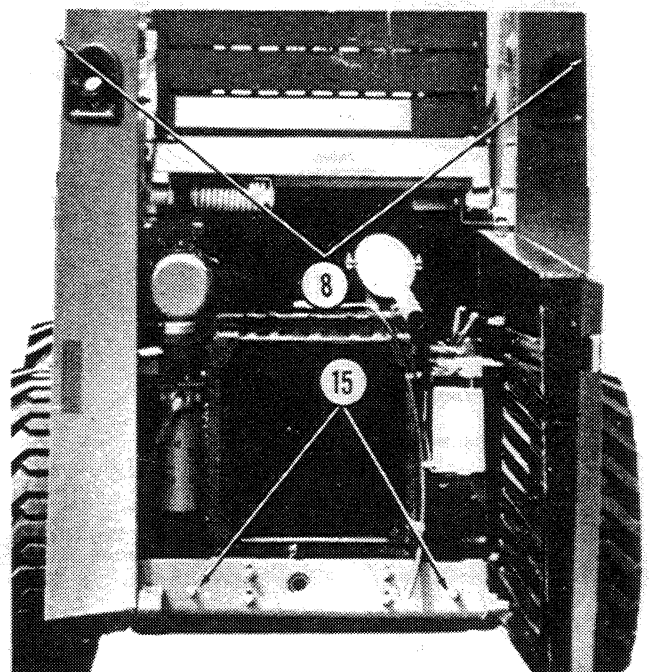
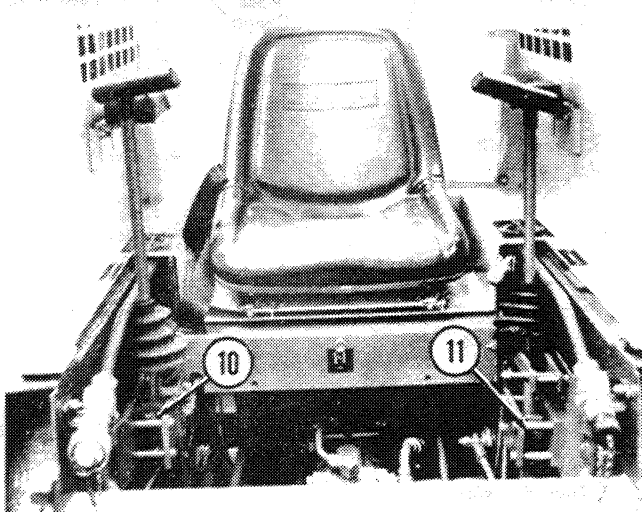
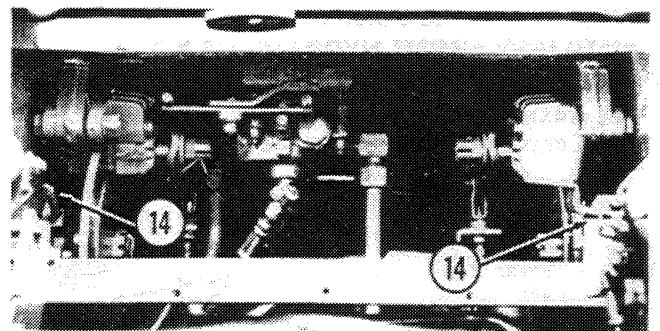
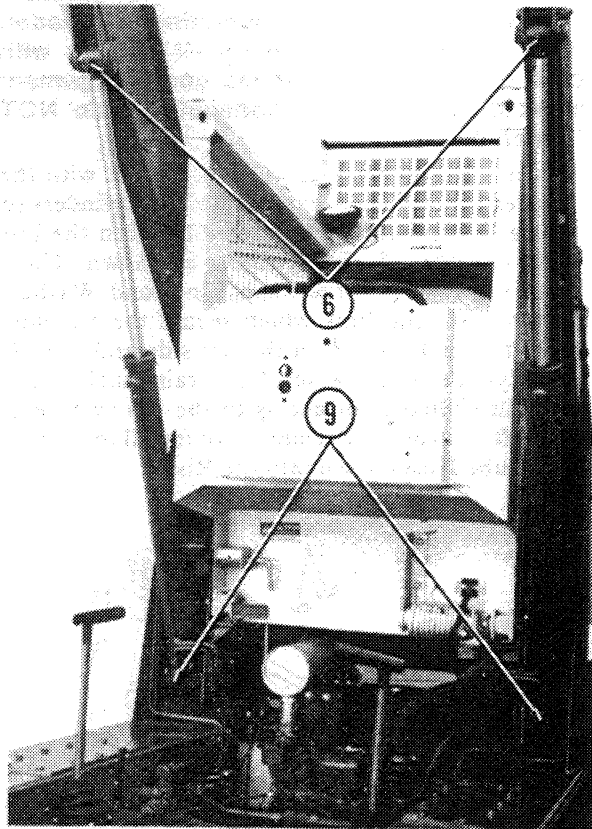
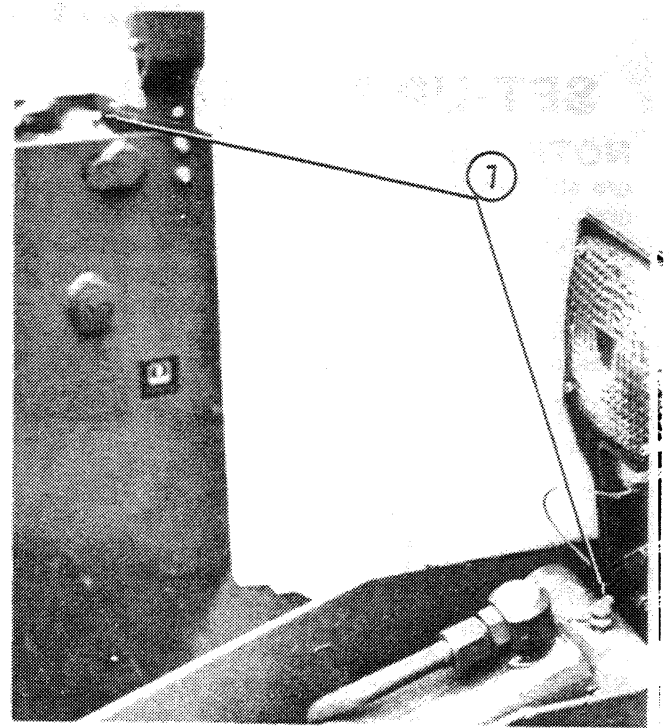
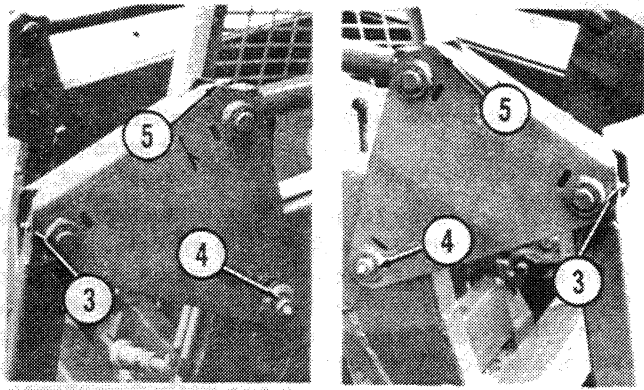
\* Remove T-bar Console for access to Fitting

\*\* Remove Wheel for access to Fitting

\*\*\* Remove Front Floorplate for access to Fitting







# CHAPTER 9

## SET-UP & ASSEMBLY

**NOTE:** The SL4510 and SL4610 Skid Loaders are shipped from the factory (for domestic delivery) completely assembled. Customer selected Buckets, Forks or approved accessory Attachments **MUST** be mounted separately. Optional Auxiliary Front Hydraulics Kits or Work & Warning Lights Kits can be ordered factory installed or obtained separately for field installation.

**NOTE:** The following abbreviations are used in these instructions:

CB	- Carriage Bolt
CS	- Cap Screw
RHMS	- Round Head Machine Screw
TFS	- Thread Forming Screw
THMS	- Thread Head Machine Screw
N	- Nut
LN	- Lock Nut
NILN	- Nylon Insert Lock Nut
L	- Lock (Washer)
P	- Plain (Washer)
JIC	- 37° Flare SAE Fitting

### AUXILIARY FRONT HYDRAULICS KIT (Figs. 9-1 thru 9-6)

The Auxiliary Front Hydraulics Kit contains the Auxiliary Control Valve, two Footpedals (Pads), Connecting

Hoses and Tubes, Fittings, Quick-disconnect Fittings, Clamps and attaching hardware. Installation of these components should be made in the order listed to avoid unnecessary component removal and replacement.

**NOTE:** It should be understood that some oil will leak-out when the Auxiliary Hydraulics pressure and return connections are made to the Main System Valve. To minimize oil loss, carefully squeeze shut the Drain Line Hose near the Main System Valve. The Auxiliary Hydraulics to Main Valve connections should be made as one of the last steps of this installation procedure. **BE SURE** to replenish the Reservoir oil level before operating the Loader. Use pipe sealing compound on all Fittings with standard pipe threads. Exercise good judgement when securing JIC Fitting connections; do **NOT** overtighten them.

1. Lower the Lift Arms down into contact with the Loader Frame. Then, extend the Tilt Cylinders so that a convenient gap is formed between the Lift Arm and the left Tilt Cylinder as shown. Then, temporarily detach the Snap Rings and Washers and remove the Pins which secure the Leveling Link to the Tri-Link on the left side and the left Tilt Cylinder to the Riser. Next, raise back end of the Tilt Cylinder for access to the top surface of the Lift Arm and for clearance to install the Auxiliary Tube Hoses down into the Riser.

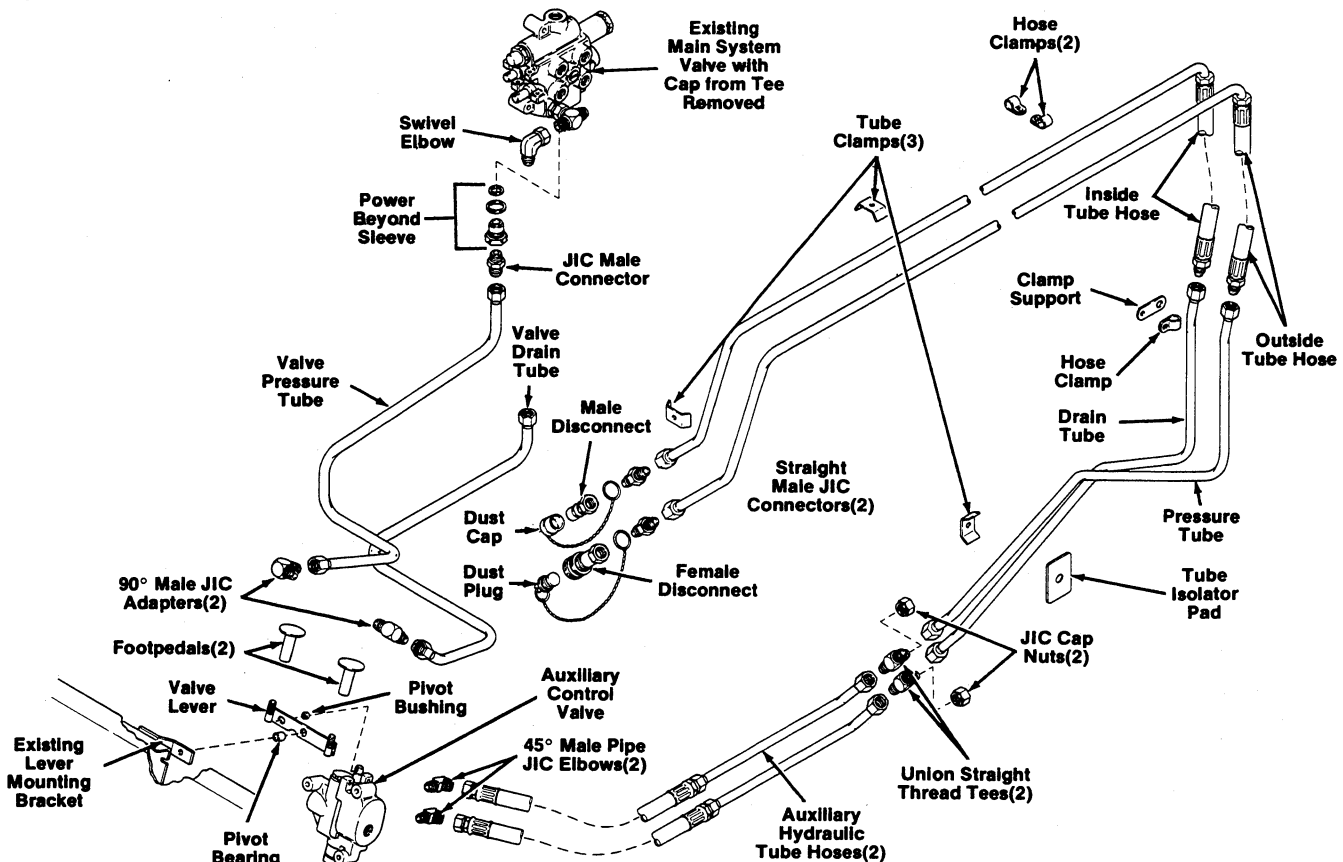


Fig. 9-1: Auxiliary Front Hydraulics Mounting Detail



2. Using a sharp knife, make the Light Switch cutout and Flasher unit Mounting Bracket Screw cutout in Right Panel Decal. Both cutouts are already provided in the Panel to follow for templates.
3. Attach the Flasher unit Mounting Bracket to the back of the Panel using a #6-24 x 1/2 RHMS, L and N. Then, attach the Flasher into the clamp brackets of the Mounting Bracket.
4. Install the Light Switch from the back of the Panel through the cutout while aligning the tab of the Switch with the notch in the Panel. Then, secure the Switch with the Mounting Ring. After the Switch is mounted, install the Knob and fasten it to the Switch Shaft.
5. Preassemble and secure the (2) Headlights and the Work/Tail Light units to their respective Mounting Brackets (furnished with the Lights). Then, secure the Headlights to the undersides of the Overhead Guard, in the appropriate positions shown, using (1 each) 3/8 NF x 1 CS, L and 3/8 NF-N. Route the Wire leads from the Headlights through the appropriate holes through the Overhead Guard and into the area of the Panel mounting location.
6. Plug the Light Wire Harness onto the Light Switch. Then, refer to the appropriate Electrical Wiring Diagram (for your model Loader) in the Service chapter for the correct color-coded lead interconnections to be made between the Light Wire Harness, the Main Wire Harness, the Flasher unit, the Headlights and the Loader Battery power.

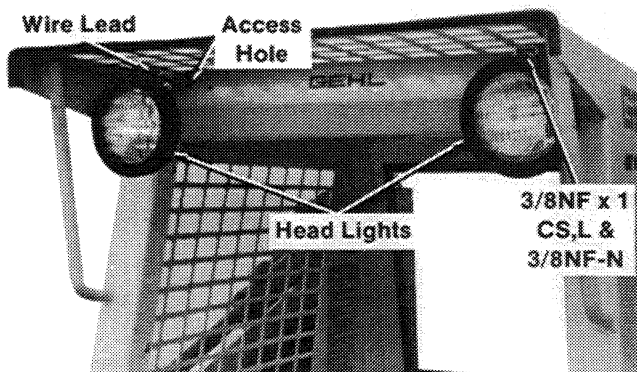


Fig. 9-8

7. After the proper wire connections are made, turn the Ignition Key to the "accessory" or the "on" position and test the Headlights. After they are checked-out, shut off the Ignition Key and proceed to replace the Overhead Instrument and Control Panel by resecuring it with the (5) Truss Head Screws.
8. Attach and secure the Work/Tail Light (with its Mounting Bracket already preassembled) to the back of the Overhead Guard and secure it. Make sure that the two leads for connection to the Work/Tail Light are brought out of the Harness before the Light is secured.

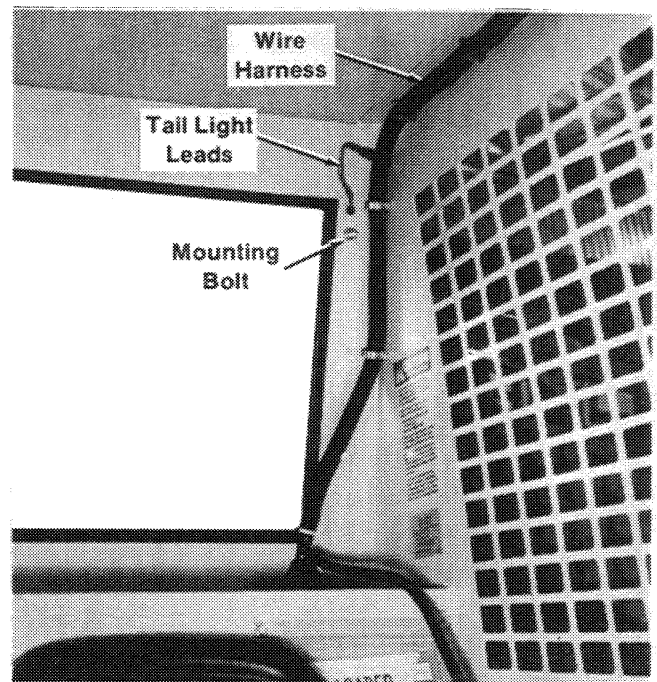


Fig. 9-9

9. After the Work/Tail Light is mounted, route its two leads through the access hole in the Overhead Guard and connect the Light leads to the Wire Harness leads, following the color-coding shown in the Wiring Diagram. Once again, turn the Ignition Key and test the function of the Work/Tail Light before proceeding.
10. Preassemble the Flashers to their respective Mounting Brackets and Guards (with the hardware provided) and then secure the Brackets to the top inside walls of both Chassis Risers using (2 each) 5/16 x 1 CS, L and N. **BE SURE** that both Flashers and their Mounting Brackets are properly oriented before tightly securing the attaching hardware. Install a 058615 Clamp on each side using the top Light Bracket mounting bolt.
11. After the Flashers are mounted, route the Wire leads from each Light assembly through the Loom and down through the Risers, behind the Tilt Cylinder and Lift Arm pivots and out in front of the Risers.

Using an available hole near the bottom of each inside Riser wall, anchor the lead from each Flasher with a 068256 Clamp. **BE SURE** that all slack is taken-up, along the path of the wire between the Clamps on both sides, to prevent the Leads from being pinched by the pivoting Arms and Cylinders.

Last, connect the leads to appropriate mating connections from the Engine Harness which are on each side of the Engine. Refer to the Wiring diagram for color-code verification. Once the leads are connected, turn the Ignition Key and check the function of the Flashers as well as all other combinations of Light functions.

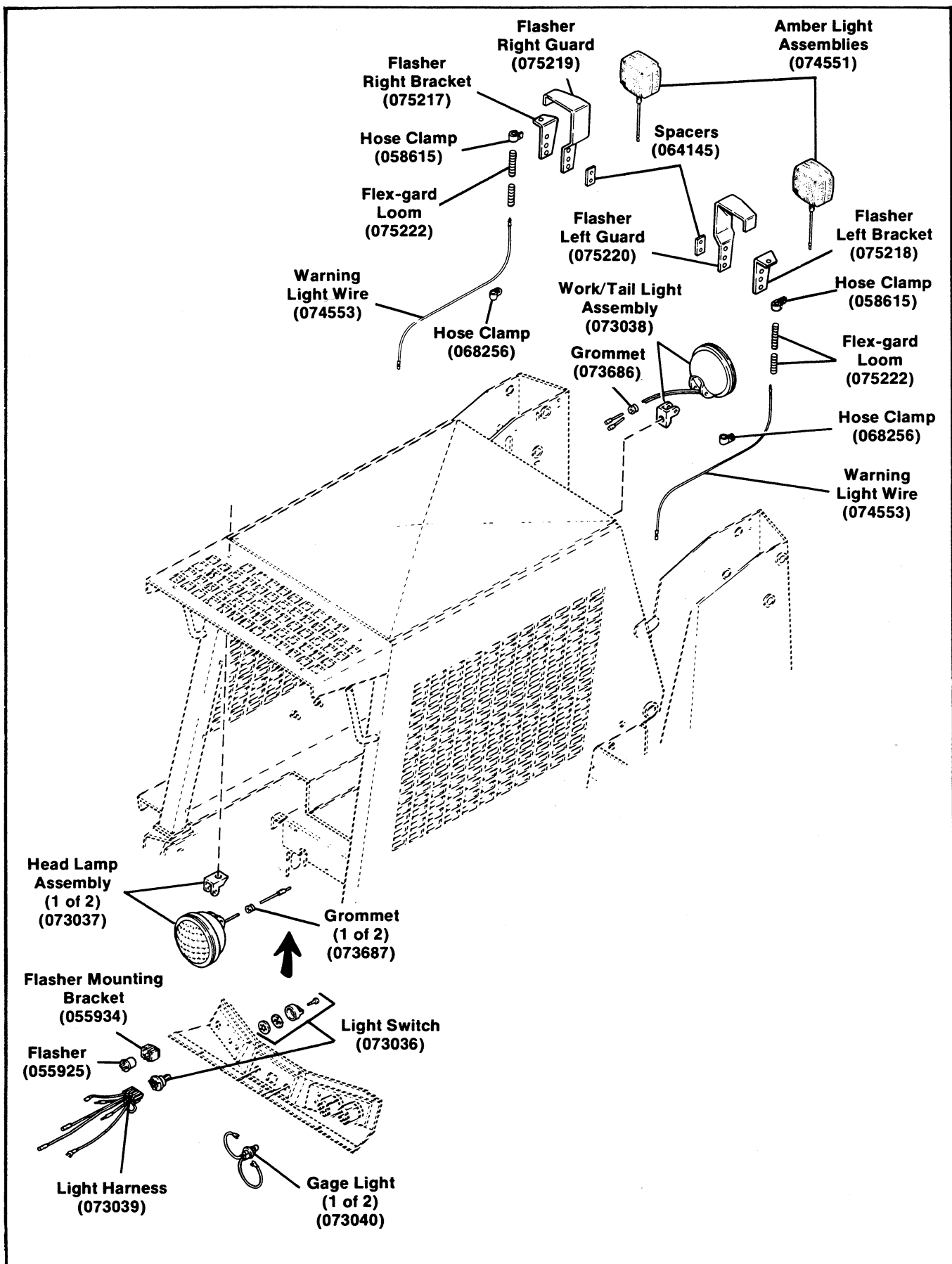


Fig. 9-10: Light Kit Mounting Detail

# CHAPTER 10

## OPTIONAL FEATURES & ACCESSORIES

### ATTACHMENTS & ACCESSORIES

#### Buckets (Fig. 10-1)

As listed in the Specifications chapter of this manual, several size and differing purpose Buckets are available. Refer to the Operation chapter for mounting and removal information. To obtain the desired Bucket, order it by the appropriate stock number.

Stock Number	Description
802400	40" (1015 mm) Cement Bucket
802401	60" (1525 mm) Utility Bucket
802402	65" (1650 mm) Utility Bucket
802403	65" (1650 mm) Light Material Bucket
802404	65" (1650 mm) Granular Fertilizer Bucket
802405	72" (1830 mm) Produce Bucket



Fig. 10-1: Typical Utility Bucket

#### Dirt & Rock Teeth Kit

When desired, the 60" or 65" Utility Buckets can be equipped with a Dirt and Rock Teeth Kit (800679) which contains a total of eight (8) Teeth. The Teeth are properly and evenly spaced and welded onto the Bucket Cutting Edge. Refer to the separate mounting instructions furnished with the Kit for additional information.

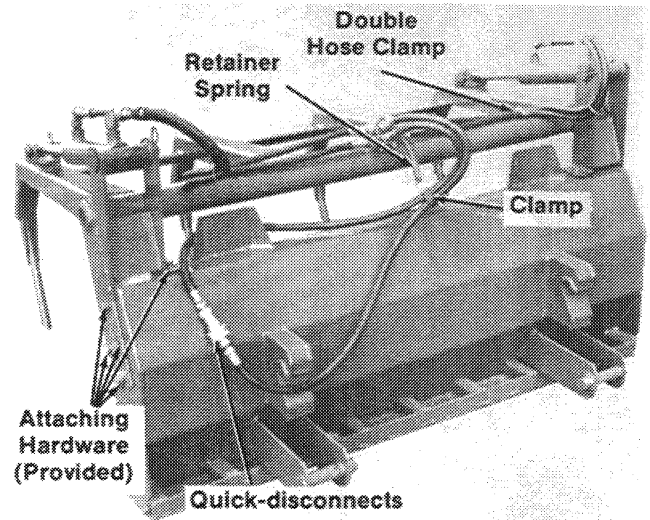


Fig. 10-2: Rear View of Grapple Installed on Manure Fork

#### Grapple Fork (Figs. 10-2 & 10-3)

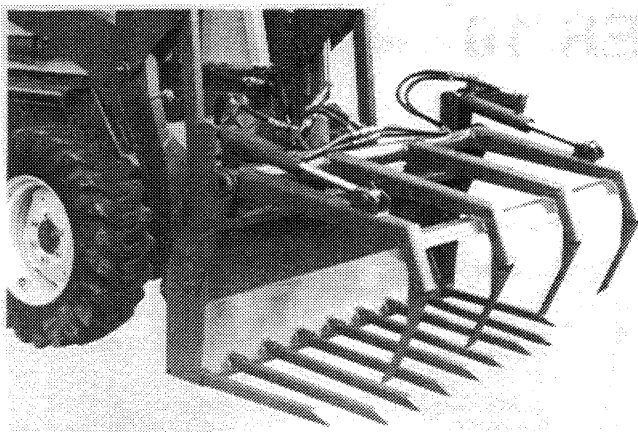
**NOTE:** To operate the Grapple Fork, the Loader **MUST** be equipped with either factory or field installed Front Auxiliary Hydraulics.

The Grapple Fork Kit (802424) is available for direct attachment (using holes already provided) onto a 60" wide Manure Fork or for optional attachment (using field installed mounting holes) onto a 60" wide Utility Bucket. The Kit includes the 4-Fork Grapple assembly, the Right and the Left Grapple Mounting Brackets with Bracket attaching hardware, (2) Dual-acting Cylinders with Anchor and Locking Pins, interconnecting Hoses and Fittings, a U-bolt and attaching hardware, a Retraction Spring and attaching hardware and a Male Quick-disconnect and Female Quick-disconnect Fittings. All of the components are assembled as shown making sure that the front Cylinder ports are Tee'd together and the rear Cylinder ports are Tee'd together and respectively terminated with the Male and Female Quick-disconnects.

**NOTE:** When the Grapple is mounted onto a 60" wide Utility Bucket, use the Right and Left Grapple Mounting Brackets as templates to mark and drill the 10 total 17/32" diameter mounting holes in the top and sides of the Bucket.

#### Manure Fork (Fig. 10-3)

A 60" wide Manure Fork (802425) is available for use on SL4010 Series Skid Loaders. The Manure Fork has (7) sharp-pointed 25" (635 mm) long inside Tines and (2) sharp-pointed 21" (533 mm) long outside Tines which are attached to the Support assembly with Cotter Pins.



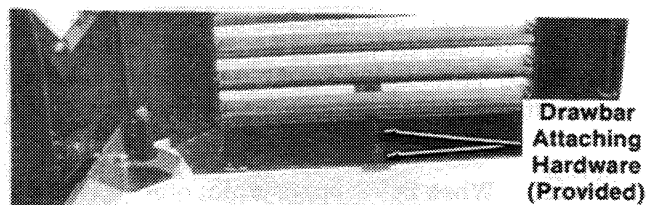
**Fig. 10-3: Manure Fork with Mounted Grapple Fork**



**Fig. 10-4: Pallet Fork**

#### **Pallet Fork (Fig. 10-4)**

The Pallet Fork Attachment (802449) is a 4 piece assembly composed of a Lower Carriage, a Backrest Extension and (2) adjustable-position 30" (762 mm) long Forks. The Forks have built-in locking handles and pins which engage equally spaced holes in the Carriage.



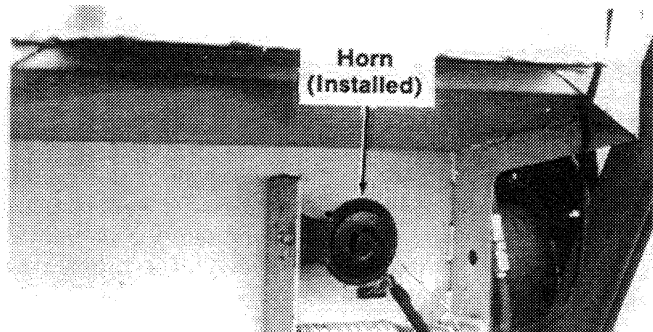
**Fig. 10-5: Drawbar Mounted**

#### **AUXILIARY FRONT HYDRAULICS**

The Front Auxiliary Hydraulics Kit is available either factory installed (802349) or for field installation (802503) on an SL4010 Series Skid Loader. A Skid Loader **MUST** be equipped with Auxiliary Front Hydraulics in order to operate a Grapple Fork, Backhoe or Posthole Auger. Refer to Set-up & Assembly chapter for field installation details to equip the Loader with the Auxiliary Kit.

#### **DRAWBAR KIT (Fig. 10-5)**

Either model Skid Loader can be equipped with a field installed Drawbar Kit (802437). The Kit includes the Drawbar Plate and attaching fasteners. Mount the Drawbar in the position and direction shown using the holes already provided in the Hinged Rear Guard.



**Fig. 10-6: Horn Kit (Installed)**

#### **HORN KIT (Fig. 10-6)**

When desired, either Skid Loader model can be equipped with a field installed Horn Kit (802255). The Kit consists of a Pushbutton Switch, the Horn unit and color-coded interconnection leads. To install the Horn Kit, proceed as follows:

1. Raise the Lift Arms, engage the Mechanical Lift Cylinder Lock and exercise the **MANDATORY SAFETY SHUTDOWN PROCEDURE (page 8)**.
2. Install the Horn to the underside of the Overhead Guard, using the hardware provided.
3. After the Horn unit is mounted, make the single lead connection between the Horn and the Main Wire Harness which is down below the Guard. Refer to the appropriate Wiring Diagram in the Service chapter for color-coding identification.
4. After the Horn unit is installed and wired, proceed to mount the Pushbutton Switch. First, temporarily detach the Main Wire Harness Trough which is protecting the Wire Harness along the inside left corner of the Overhead Guard. Then, with the Trough detached, temporarily remove the Overhead Instrument and Control Panel by removing the (5) Truss Head Machine Screws. After the Panel is detached, carefully lower it and turn it around for access to the wiring on the back.

**NOTE:** Refer to illustrations provided with field mounting the Work & Warning Light Kit in the Set-up & Assembly chapter, for additional details.

5. Using a sharp knife, make the Horn Button cutout in the Left Panel Decal for the Pushbutton.
6. Then, install the Pushbutton and secure it.
7. Refer to the appropriate Wiring Diagram in the Service chapter and make the appropriate color-coded wire lead connections.

8. After the Horn Pushbutton is mounted and wired, test its function with the Ignition Key turned to "on" or "accessory". After correct operation is verified, replace the Overhead Instrument and Control Panel and the Wire Harness Trough to complete the Kit installation.

#### HYDRAULIC OIL HEATER KIT (Fig. 10-7)

Either model Skid Loader can be equipped with a field installed Hydraulic Oil Heater Kit (802517). The Heater operates on regular line cord 120 volt A.C., 60 hz connection to warm the Reservoir oil when the Loader is **NOT** running and is standing in below 0°F temperatures. To install the Oil Heater Kit, proceed as follows:

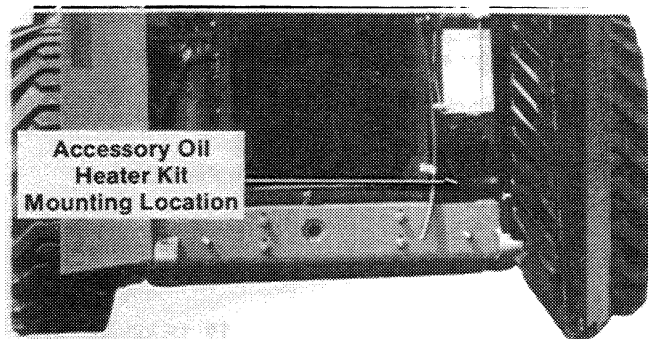


Fig. 10-7: Oil Heater Kit (Installation Location)

1. Open the Hinged Rear Guard for access. Remove the Pipe Plug which is in the Heater Element mounting hole.
2. Using pipe sealing compound on its threads, install the Element into the Bushing and the assembly into the threaded hole.
3. With the element installed, attach the Line Cord to complete the Heater Kit installation.



**CAUTION: BEFORE plugging the Heater Element Cord into a grounded 120 volt A.C. outlet, BE SURE that the Loader is grounded, the Engine is OFF and Ignition Key is removed.**

#### SOUND-DEADENING PACKAGES

A Sound-deadening Package is available either factory installed (802469) or for field installation (802470). Installation detail are furnished with the field installation package of parts.

#### WORK & WARNING LIGHTS

A Work & Warning Light Kit is available either factory installed (802435) or for field installation (802436). Refer to the Set-up & Assembly chapter for field installation details.

## CHAPTER 11

### DECAL LOCATIONS

#### GENERAL INFORMATION

Decal Locations information is provided to assist in the proper selection and application of new decals, in the event the original decal(s) become damaged or the machine is repainted. Refer to the listing for the illustration reference number, part number, description and quantity of each decal provided in the Kit. Refer to the appropriate illustration(s) for replacement location(s).

**NOTE:** Certain decals are included in the Kit which are described in the listing as "not shown". These decals may be for different RPM or earlier style units or, for optional field-installed equipment which may or may NOT apply to your machine.

To insure proper selection of the correct replacement decals, compare all of the various closeup location photographs to your machine, before starting to refinish the unit. Then, circle each pictured decal (on or otherwise applicable to your machine) while checking-off its part number in the listing. After you have verified all the decals needed for replacement, place the extra unnecessary decals aside for disposal.

**NOTE:** Always order decals by the set number listed; do NOT order by separate part numbers. For various reasons, your unit may have some Warning decals which have been superseded by more current Warning, Caution or Danger decals. If such is the case, read the information in the decal on your machine and select the new decal from the Kit which expresses the same directives.

#### NEW DECAL APPLICATION

Surfaces **MUST** be free from dirt, dust, grease and other foreign material before applying the new Decal. To apply, remove the smaller portion of the decal backing paper and apply this part of the exposed adhesive backing to the clean surface while maintaining proper position and alignment. Peel the other portion of the backing paper off slowly while applying hand pressure to smooth out Decal surface.

## NEW DECAL APPLICATION

Surfaces **MUST** be free from dirt, dust, grease and other foreign material before applying the new Decal. To apply, remove the smaller portion of the decal backing paper and apply this part of the exposed adhesive backing to the clean surface while maintaining proper position and alignment. Peel the other portion of the backing paper off slowly while applying hand pressure to smooth out Decal surface.



**CAUTION: Always Observe Safety Rules Shown on Decals. If Decals become damaged, or if unit is repainted, replace Decals. If repainting, BE SURE that all Decals from the Kit(s) which apply to your machine, are affixed to your unit.**

### NOTICE

Order paint for refinishing machines from this list:

901225	One Gallon Blaze Paint
902872	One Gallon Gray Paint
902873	One Gallon Black Paint
610239	6 (12 oz.) Cans Blaze Spray Paint
902874	6 (12 oz.) Cans Gray Spray Paint
902875	6 (12 oz.) Cans Black Spray Paint

The Decal Set Number for the SL4510 and SL4610 Skid Loaders is 075323. The Set includes the following Decals:

#### On Loader Frame or Lift Arms

- 1 - 074260 Left Fender Stripes
- 2 - 074270 Left Riser Stripes
- 3 - 072796 Decal - Gasoline Symbol (SL4510 Only)
- 072797 Decal - Diesel Fuel Symbol (SL4610 Only)
- 4 - 072794 Decal - Hydraulic Oil Symbol
- 5 - 074269 Right Riser Stripes
- 6 - 074267 Right Fender Stripes
- 7 - 073151 CAUTION - Carry Load Low
- 8 - 072795 Decal - Choke Symbol (SL4510 Only)
- 9 - 067493 Red Reflector Strip (2 Places)
- 10 - 076445 WARNING - Jump-starting Loader

#### On Overhead Guard

- 11 - 073030 GEHL 1-13/32 x 5-11/32
- 12 - 073031 GEHL 3-5/8 x 14-3/8 (2 Places)
- 13 - 074274 4610 (2 Places)
- 074271 4510 (2 Places - Not Shown)
- 14 - 074433 WARNING - Keep Feet Inside
- 15 - 073152 CAUTION - Carry Load Low
- 16 - 074672 CAUTION - Operating Capacities
- 17 - 073076 Decal - Brake Symbol
- 18 - 072854 Decal - Propulsion T-bar Operation Symbol
- 19 - 076894 CAUTION - Read Operator's Manual
- 20 - 074673 Decal - Overhead Guard (ROPS) Rating
- 21 - 073391 CAUTION - Keep Operator's Manual Here
- 22 - 073086 CAUTION - General Safety
- 23 - 072853 Decal - Lift/Tilt T-bar Operation Symbol
- 24 - 072817 Decal - Diesel Shut-off Symbol (SL4610 Only)
- 25 - 073075 Decal - Slow-Fast (Turtle-Rabbit) Symbol
- 26 - 073173 CAUTION - Mechanical Lift cylinder Lock Operation

- 27 - 073155 CAUTION - Fasten Seat Belt
- 28 - 074434 CAUTION - Secure Rapid Tach Handles
- 29 - 075034 CAUTION - Wiring connections - Not Shown
- 30 - 073150 CAUTION - Safety Pin for Overhead Guard Locking

#### On Instrument & Control Panel

- 31 - 072936 Decal - Middle of Panel
- 32 - 072937 Decal - Right Side of Panel
- 33 - 072935 Decal - Left Side of Panel

#### On Outside of Hinged Rear Guard

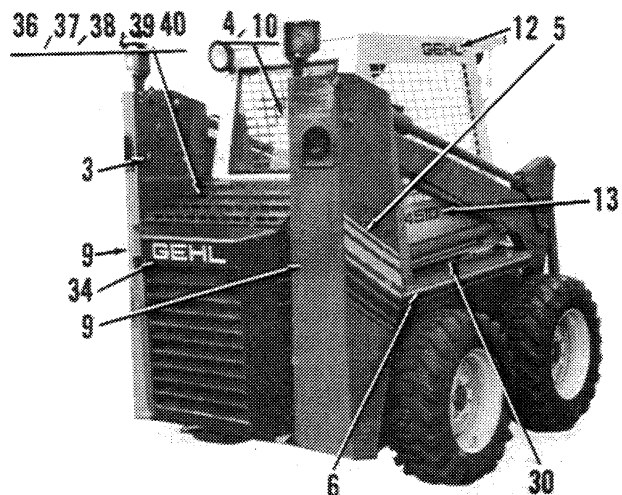
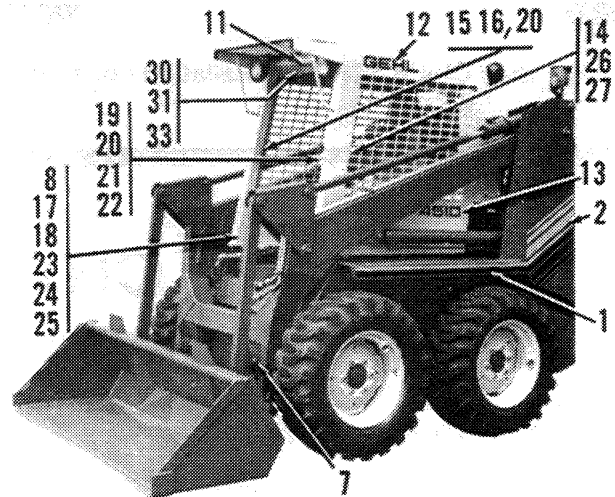
- 34 - 073081 GEHL (Gray on Black)

#### On Underside of Louvered Engine Access Cover

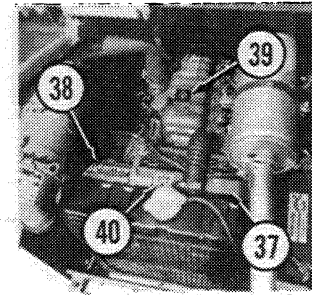
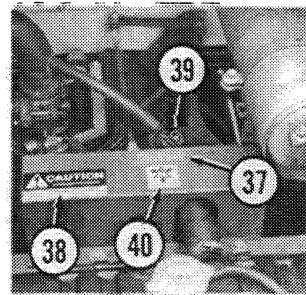
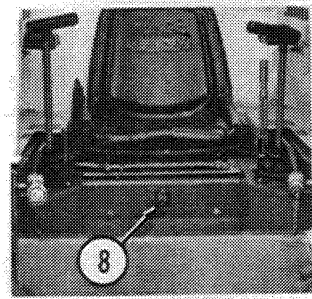
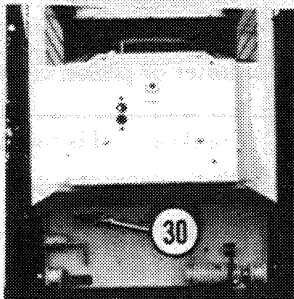
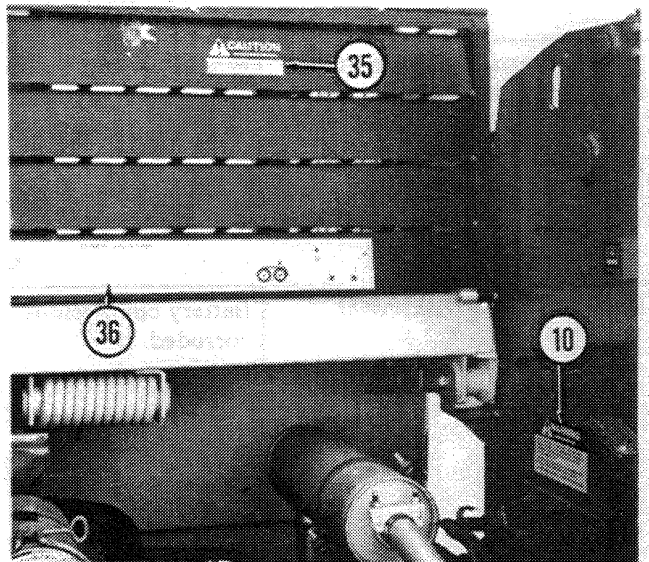
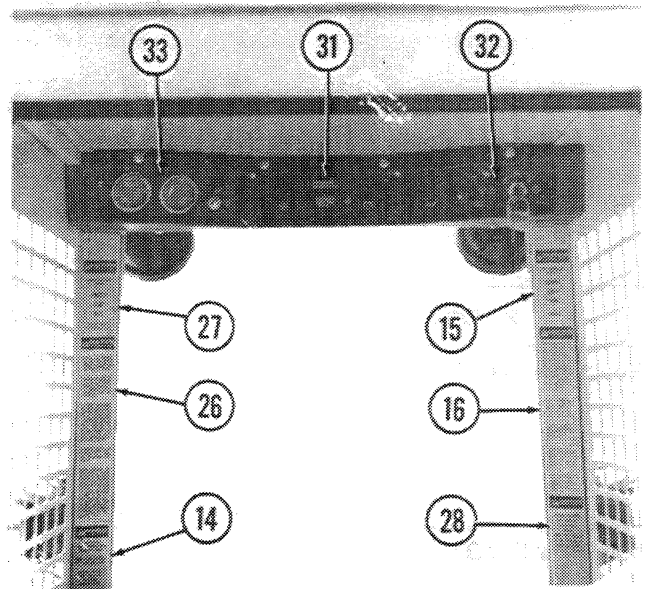
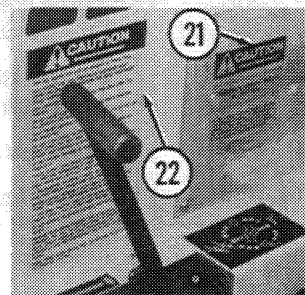
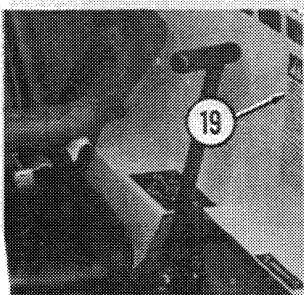
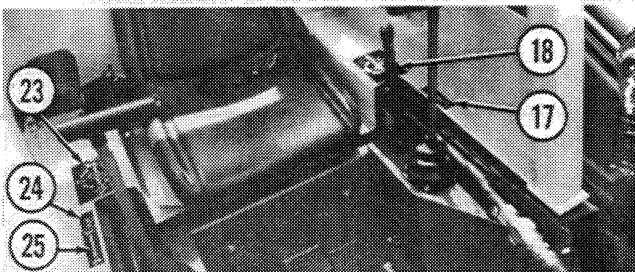
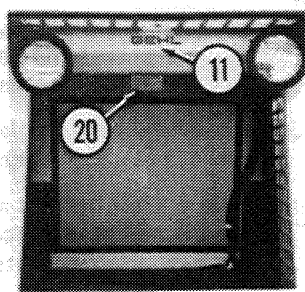
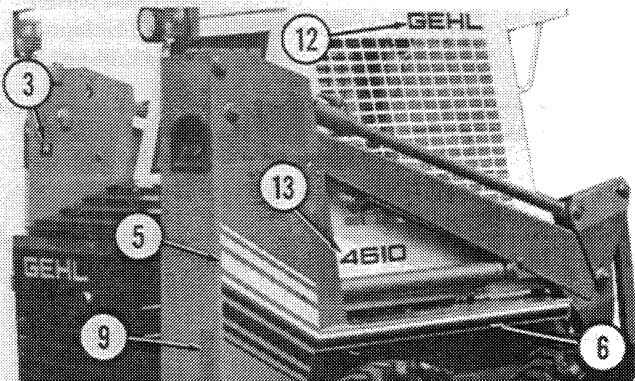
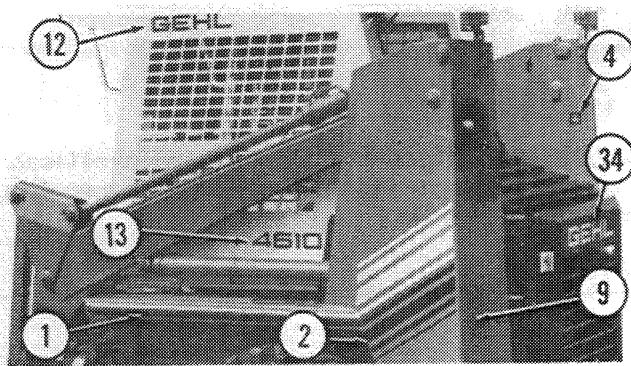
- 35 - 073153 CAUTION - Ground Loader
- 36 - 074674 Decal - Service Schedule

#### On or Around Engine & Radiator

- 37 - 056859 Decal - Coolant Mixture
- 38 - 072058 CAUTION - Close or Replace Guard
- 39 - 072793 Decal - Engine Oil
- 40 - 072798 Decal - Coolant Under Pressure Symbol
- 41 - 064873 Non-skid Strip (3 Places - Not Shown)







Gasoline Engine Model

Diesel Engine Model



# CHAPTER 12

## TROUBLESHOOTING

**NOTE:** This Troubleshooting guide presents problems, causes and remedies beyond the extent of loose, worn or missing parts and is developed in consideration of the Loader being in otherwise good operating condition. Refer to the Index for chapter and topic page number references.

### ELECTRICAL SYSTEM

PROBLEM	CAUSE	REMEDY
Starter will <b>NOT</b> crank.	Starter circuit fuse is blown. Battery connections are loose or corroded, Starter Solenoid is defective or Seat-actuated Electrical Switch is <b>NOT</b> operating properly.	Replace Starter 25 ampere fuse. Clean the Battery terminals and cables and retighten them or replace Solenoid or readjust Seat-actuated Switch per detail in Adjustments chapter.
Battery will <b>NOT</b> recharge.	Terminals or cables are loose or corroded, Battery is defective, Alternator (or Regulator) is defective.	Clean the Battery terminals and cables and retighten them or replace Battery. Alternator output can be checked by dealer.
Entire Electrical System does <b>NOT</b> function. Gauges and Instrument Panel Switches do <b>NOT</b> work.	Fuse in Starter Circuit is blown. Fuse in Instrument Panel is blown.	Replace Fuse with new 25 ampere fuse. Replace with new 20 ampere fuse.

### ENGINE

Engine will <b>NOT</b> turn over.	Battery connections are loose or corroded. Battery is discharged or defective. Driver is <b>NOT</b> sitting on Seat or Safety Seat-actuated Switch is <b>NOT</b> functioning or properly set. Wire lead connections to and from Ignition Switch, Safety Seat-actuated Switches, etc., are loose or disconnected. Starter or pinion is faulty.	Clean the Battery terminals and retighten them. Recharge Battery (refer to Battery topic in Service chapter) or replace Battery Sit on Seat and start Engine. Refer to Seat-actuated Switches topic in Adjustments chapter for readjustment details. Check all terminals and connections for loose termination or broken leads. See Engine manual or contact dealer for directives.
Engine overheats.	Crankcase oil is too full or too low. Engine is overloaded. Cooling System is low on water. Fan air circulation is blocked. Fan Shroud improperly positioned. Grade of oil improper or dirty. Exhaust is restricted. (SL4510 Only) Engine out of timing.	Add or remove oil. Operate Loader at 1/2 to full Throttle. Add water or coolant. Remove restriction. Readjust Radiator so that the Fan is 1/3 to 1/2 of the way Shrouded. Drain and replace with proper grade of oil or new oil. Remove restriction when cool. Refer to Engine Manual.

### ENGINE (Con't.)

PROBLEM	CAUSE	REMEDY
Engine turns-over but will <b>NOT</b> start.	(SL4510 Only) Spark Plugs are fouled.	Clean and regap Plugs.
	Battery is weak or drained.	Check Battery charge, then recharge or replace it if it does <b>NOT</b> hold a charge.
	(SL4510 Only) Distributor timing is off.	Reset timing to 10° - 12° BTDC.
	Fuel is <b>NOT</b> reaching SL4510 Carburetor.	Check Fuel Filter for blockage; clean or replace. Check fuel pump.
	(SL4510 Only) Fuel is <b>NOT</b> reaching Carburetor.	Replace or reset gap to 0.032.
	Engine cranking speed is too slow.	Battery requires recharging or (in cold temperatures) pre-warm oil.
	Fuel Tank is empty.	Check Fuel Gauge and refill Tank. On SL4610 only, if Tank was run dry, system will require de-aerating before attempting to start; see your Diesel Engine manual for de-aerating procedure.
	(SL4610 Only) Throttle Control is in "Shutdown" position.	Move Throttle to midpoint of travel and start Engine.
	(SL4610 Only) Pump is <b>NOT</b> pumping fuel.	Refer to Diesel Engine manual.
	Air or moisture in fuel line.	Refer to Engine manual

### HYDRAULIC LIFT AND BUCKET

No response to Lift Arm or Bucket.	Gear pump damaged.	Inspect Gear Pump internally or Drive Shaft.
	System Valve Relief <b>NOT</b> functioning.	Check pressure at Cylinder.
	Oil flow to pump blocked.	Inspect Suction Hose and Reservoir.
Lift Arm does <b>NOT</b> raise. Bucket works properly.	Seat-actuated Switch, Relay or Solenoid <b>NOT</b> functioning.	Check Electrical connections to Switch, Relay and Solenoid.
	First Spool in System Valve leaking.	Check flow and pressure to Lift Cylinder.
Hydraulic Cylinder action slow.	Badly worn System Pump.	Check pressure and flow.
Lift Arm does <b>NOT</b> maintain raised position with T-bar in neutral.	Oil leaking past Cylinder packing.	Check condition of Piston Rings and Cylinder bore.
	Oil leaking past spool in valve.	Check spool and valve body for score or cracks. Replace Control Valve if necessary.
	Leaking lines on fittings between Control Valve and Cylinders.	Inspect for leaks.
Tilt Cylinder is slow, inoperative or leaks down.	Oil is leaking past the Cylinder Packing.	Check Piston Rings and Cylinder Bore.
	Self-leveling 1000 PSI Relief Valve is defective.	Replace Relief Valve.
	Oil is leaking past the Valve Spool.	Inspect Spool for dirt and, if necessary, replace Valve if Spool is damaged.

## HYDROSTATIC DRIVE

PROBLEM	CAUSE	REMEDY
No response from either hydro-static Drive or Lift/Tilt System.	<p>Oil too heavy.</p> <p>Oil supply too low.</p> <p>Reservoir strainer plugged.</p> <p>Drive disconnected.</p> <p>Sheared Spline or broken Shaft in Tandem pump assembly.</p>	<p>Allow longer warm-up. Replace with proper viscosity (weight) oil.</p> <p>Check for low oil level in reservoir. Add oil if necessary.</p> <p>Remove Reservoir Cover and clean strainer. Also, inspect Reservoir for foreign object plugging system.</p> <p>Check for broken or worn Coupling and replace if necessary.</p> <p>Check Splined Shaft on pump closest to Engine. Replace Shaft if broken or if Splines are sheared.</p>
Traction Drive will <b>NOT</b> operate in either direction.	<p>Hand Brake on.</p> <p>Oil too heavy.</p> <p>Tow valves turned for towing.</p> <p>Control linkage disconnected.</p> <p>Low or no drive pump charge pressure.</p> <p>Charge pump gears worn or damaged.</p> <p>Charge pump relief valve damaged.</p> <p>Charge pump key sheared.</p> <p>Super-charge valve malfunctioning.</p> <p>All four drive pump relief valves malfunctioning.</p> <p>Both primary drive chains disconnected.</p> <p>Worn drive motor sprockets or sheared motor shaft splines.</p>	<p>Disengage Hand Brake.</p> <p>Allow longer warm-up.</p> <p>Replace with proper viscosity (weight) oil.</p> <p>Return valves to normal operating position.</p> <p>Check linkage connections at T-bar and drive pump pivot arms. Reconnect linkage if necessary.</p> <p>Check charge pressure. Pressure should be 60-150 PSI.</p> <p>Replace gerotor gears.</p> <p>Replace drive pump adapter assembly (includes relief valves).</p> <p>Replace key.</p> <p>Check charge inlet pressure. Pressure should be 12-20 PSI. If necessary, replace super charge valve in reservoir cover.</p> <p>Inspect and clean valves. If necessary, replace relief valves.</p> <p>Reconnect and adjust chains.</p> <p>Replace sprockets or motor shafts.</p>
Drive wheels do <b>NOT</b> turn in proper direction for T-bar movement.	<p>One or both drive motors mounted upside-down.</p> <p>Hydraulic lines between pumps and motors connected to wrong ports.</p>	<p>Remount motors with small drain port in proper position.</p> <p>Reconnect hydraulic lines to proper ports on motors and/or pumps.</p>

### HYDROSTATIC DRIVE (Con't.)

PROBLEM	CAUSE	REMEDY
Right side does <b>NOT</b> drive in either direction. (Left side operates normally).	<p>Right side primary drive chain disconnected.</p> <p>Excessive leakage in right drive motor.</p> <p>Excessive leakage in rear pump.</p> <p>Worn drive motor sprockets or sheared motor shaft spline.</p> <p>Key missing on rear pump Pivot Arm and Pivot Arm is loose on Control Shaft.</p> <p>Both pump relief valves of rear pump malfunctioning.</p> <p>Damaged check valves.</p>	<p>Reconnect or replace chain.</p> <p>Remove motor drain line and measure leakage. Repair or replace motor if defective.</p> <p>Remove pump drain line and measure leakage. Repair or replace rear pump.</p> <p>Replace sprockets or motor shaft.</p> <p>Replace key. Torque hexagon head cap screws on coupler 35-40 ft-lbs.</p> <p>Switch relief valves with front pump valves and test for proper right side operation. If this corrects problem, clean or replace defective relief valves.</p> <p>Disassemble rear pump and check for damaged or faulty check valves. If necessary, clean or replace valves.</p>
Right side does <b>NOT</b> operate in forward direction.	<p>Malfunction of relief valve on right side of rear pump.</p> <p>Control linkage to rear pump mis-adjusted (too short).</p> <p>Key missing in rear pump Pivot Arm and Pivot Arm rotated clockwise on Pump Control Shaft.</p> <p>Damaged check valve on right side of rear pump.</p>	<p>Switch relief valve with that from the left side of rear pump. Problem should switch to reverse direction. If necessary, clean or replace faulty valve.</p> <p>Readjust linkage.</p> <p>Replace key. Torque hexagon head cap screws on coupler 35-40 ft-lbs.</p> <p>Disassemble and check if valve is faulty or damaged. Repair or replace valve if necessary.</p>
Right side does <b>NOT</b> operate in reverse direction.	<p>Malfunction of relief valve on left side of rear pump.</p> <p>Control linkage to rear pump mis-adjusted (too long).</p> <p>Key missing in rear pump Pivot Arm and Pivot Arm rotated counter-clockwise on Pump Control Shaft.</p> <p>Damaged check valve on left side of rear pump.</p>	<p>Switch relief valve with that from the right side of rear pump. Problem should switch to forward direction. If necessary, clean or replace faulty valve.</p> <p>Readjust linkage.</p> <p>Replace key. Torque hexagon head cap screws on coupler 35-40 ft-lbs.</p> <p>Disassemble and check if valve is faulty or damaged. Repair or replace valve if necessary.</p>

### HYDROSTATIC DRIVE (Con't.)

PROBLEM	CAUSE	REMEDY
Left side does <b>NOT</b> drive in either direction. (Right side operates normally).	<p>Left side primary drive chain disconnected.</p> <p>Excessive leakage in left drive motor.</p> <p>Excessive leakage in front pump.</p> <p>Worn drive motor sprockets or sheared motor shaft spline.</p> <p>Key missing on front pump Pivot Arm and Pivot Arm is loose on Pump Control Shaft</p> <p>Both pump relief valves of front pump malfunctioning.</p> <p>Damaged check valves.</p>	<p>Reconnect or replace chain.</p> <p>Remove motor drain line and measure leakage. Repair or replace motor if defective.</p> <p>Remove pump drain line and measure leakage. Repair or replace front pump.</p> <p>Replace sprocket or motor shaft.</p> <p>Replace key. Torque hexagon head cap screws on coupler 35-40 ft-lbs.</p> <p>Switch relief valves with rear pump valves and test for proper left side operation. If this corrects problem, clean or replace defective relief valves.</p> <p>Disassemble front pump and check for damaged or faulty check valves. If necessary, clean or replace valves.</p>
Left side does <b>NOT</b> operate in forward direction.	<p>Malfunction of relief valve on right side of front pump.</p> <p>Control linkage to front pump adjustment too short.</p> <p>Key missing in front pump Pivot Arm and Pivot Arm rotated clockwise on Pump Control Shaft.</p> <p>Damaged check valve on front pump</p>	<p>Switch relief valve with that from the left side of front pump. Problem should switch to reverse direction. If necessary, clean or replace faulty valve.</p> <p>Readjust linkage.</p> <p>Replace key. Torque hexagon head cap screws on coupler 35-40 ft-lbs.</p> <p>Disassemble and check if valve is faulty or damaged. Repair or replace valve if necessary.</p>
Left side does <b>NOT</b> operate in reverse direction.	<p>Malfunction of relief valve on left side of front pump.</p> <p>Control linkage to front pump adjustment too long.</p> <p>Key missing in front pump Pivot Arm and Pivot Arm rotated counter-clockwise on Pump Control Shaft.</p> <p>Damaged check valve on left side of front pump.</p>	<p>Switch relief valve with that from the right side of front pump. Problem should switch to reverse direction. If necessary, clean or replace faulty valve.</p> <p>Readjust linkage.</p> <p>Replace key. Torque hexagon head cap screws on coupler 35-40 ft-lbs.</p> <p>Disassemble and check if valve is faulty or damaged. Repair or replace valve if necessary.</p>

### HYDROSTATIC DRIVE (Con't.)

PROBLEM	CAUSE	REMEDY
Hydrostatic (drive) system is noisy.	Oil too heavy.  Air in system.  Loose connection to charge inlet.  Internal pump or motor damage.	Allow longer warm-up. Replace with proper viscosity (weight) oil.  Check for low oil level in reservoir. Add oil if necessary.  Tighten fittings.  Remove motor and pump drain lines and measure leakage. Repair or replace motors or pumps if defective.
Hydrostatic drive overheating.	Traction system overloaded continuously.  Lift and Tilt system overloaded continuously.  Unit operated in high temperature area with no air circulation.	Improve efficiency of operation.  Improve efficiency of operation.  Reduce duty cycle and improve air circulation.
Neutral is difficult to maintain.	Control linkage ball joints loose at T-bar or drive pump pivot arms.  Control linkage misadjusted.  Key missing or loose in one or both drive pump Pivot Arms.  Friction bars do not hold T-bar in neutral.  Detent in friction bar worn.	Check and retighten or replace components.  Readjust linkage.  Inspect and, if necessary, replace key(s), or worn parts.  Tighten bolts so about 1/4 to 3/8 of the thread is showing on each bolt.  Replace friction bar.
Sluggish response to acceleration.	Air in system.  Low drive pump charge pressure.  Super-charge valve malfunctioning.  Internal motor or pump damage.  Engine not responding to load.	Check for low oil in reservoir. Add oil if necessary.  Check charge pressure. Pressure should be 60-150 PSI.  Repair gerotor, charge relief or super charge valve.  Check charge inlet pressure. Pressure should be 12-20 PSI. If necessary, replace super charge valve in reservoir cover.  Remove motor and pump drain lines and measure leakage. Repair or replace motors and pumps if necessary.  Troubleshoot and adjust engine.
Gradual turn to left produces hesitation and jerky movement.	Coupler connecting two drive pump shafts is binding.	Remove tandem pump. Split two drive pumps and adjust coupler.

# CHAPTER 13

## SERVICE

### GENERAL INFORMATION



**CAUTION:** BEFORE proceeding to perform any Service routines on the Skid Loader or unless expressly instructed to the contrary, exercise the **MANDATORY SAFETY SHUTDOWN PROCEDURE** (page 8). After Service has been performed, **BE SURE** to restore all Guards, Shields and Covers to their original positions BEFORE resuming Loader operation.

**NOTE:** All Service routines, with the exception of those described under the major topic titled "Dealer Services", are understood to be owner-operator responsibilities. Those "Dealer Services" should only be attempted by (or under the direction of) an authorized GEHL Skid Loader dealer. All Operator Services described under the 10 hour, 100 hour, 200 hour and 500 hour subtopics are also referred to by a Decal which is affixed to the underside of the louvered Engine Access Cover. Refer to the Lubrication chapter of this manual for additional lubrication information.

This Service chapter details procedures to follow for making routine maintenance checks, adjustments and replacements. The majority of the procedures are also referred to in both the Troubleshooting and Maintenance Log chapters of this manual. For Engine related adjustments and servicing procedures, **BE SURE** to refer to the separate Engine manual provided.

### DEALER SERVICES

**NOTE:** The following areas of internal component service, replacement and operating adjustments should only be attempted by (or under the direction of) an authorized GEHL Skid Loader dealer.

#### Hydrostatic Pumps & Motors (Figs. 13-1 & 13-2)

The Hydrostatic Pumps are coupled directly to each other and to the Engine Crankshaft. All service routines, related to the internal components of the Pumps, are precise and critical to proper operation. The Hydraulic Motors are also very sophisticated devices which required special know-how and tools for servicing

**NOTE:** If either the Hydrostatic Pumps or the Motors are suspected of faulty operation, contact your GEHL dealer for further information and directives.

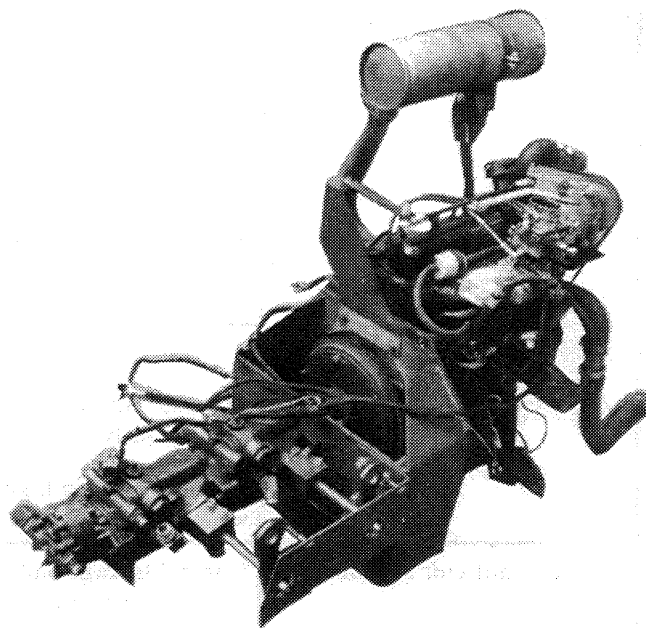


Fig. 13-1: Gasoline Engine, Tandem Pumps & Gear Pump Removed from Loader

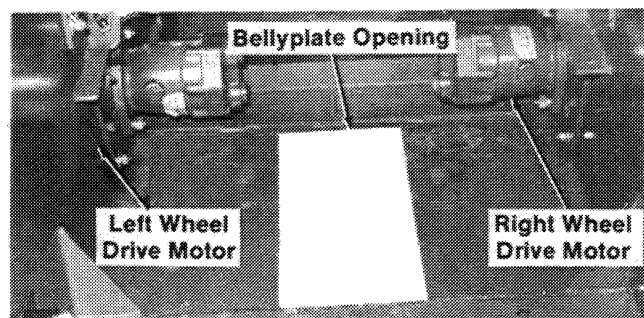


Fig. 13-2: Hydraulic Motors in Chassis with Engine, Hydrostats, Gear Pump & Piping Removed

#### Hydraulic System Pump (Fig. 13-3 & See Fig. 13-1)

The Hydraulic System Pump is coupled directly to the Front Hydrostatic Pump. This Pump would likewise require special tools and know-how for internal component servicing. However, if faulty operation is suspected and confirmed through conversation with your dealer, the Hydraulic System Pump can be detached and taken to the dealer for service. To remove the Pump, proceed as follows:

1. Raise the Lift Arms and (following proper procedures) engage the Mechanical Life Cylinder Lock. With the Lift Arms raised, exercise the **MANDATORY SAFETY SHUTDOWN PROCEDURE** (page 8).



2. Temporarily remove and retain the Front and Rear Floorplates.
3. Drain the Hydraulic Oil reservoir to a level below the Suction Line port of the Reservoir.
4. Clearly and accurately identify the Hose connections to the Hydraulic System Pump and then, remove the connections from the Pump.
5. After the Hose connections are removed, the Hydraulic System Pump can be uncoupled from the Tandem Hydrostatic Pumps and it can be taken to the dealer for service or replacement.

### Control Valves

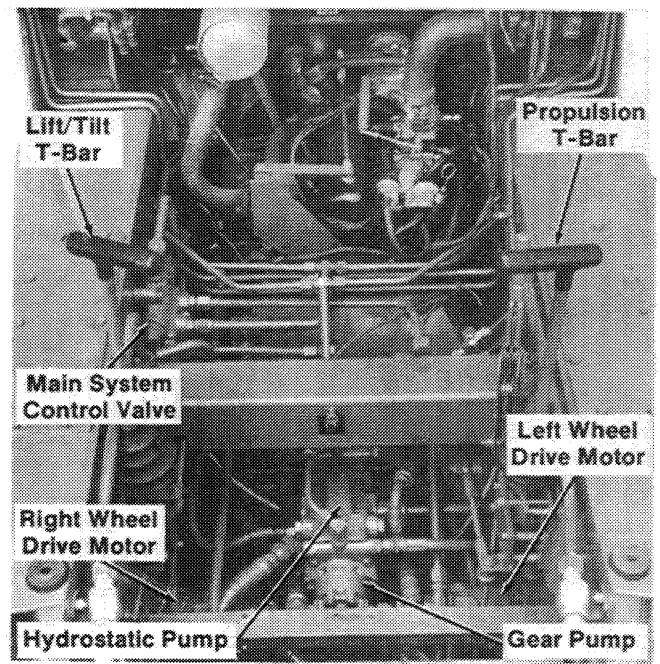
Internal component service on both the Systems Control Valve, for the Lift and the Tilt Cylinders and control circuits, and the Auxiliary Hydraulic Control Valve (on Loaders with factory or field installed Auxiliary Hydraulics connections) should only be attempted by (or under the direction of) an authorized GEHL dealer. Either Valve can be removed from the Loader and taken to the dealer for service or replacement. **BE SURE** to mark and clearly identify all Hose and Linkage connections, before disconnecting them from either Valve. Access to the Systems Control Valve is gained by locking the Lift Arms in the "raised" position and unbolting, rolling-back and locking the Overhead Guard. Access to the Auxiliary Valve is gained by removing the two Pedals and the Front Floor Plate.

### Relief Valves for Self-leveling

Internal component service on the self-leveling Relief Valves should only be attempted by (or under the direction of) an authorized GEHL dealer. The 1000 PSI Relief Valve is connected onto the Main System Valve with access gained by unbolting, rolling-back and locking the Overhead Guard. The 1250 PSI Relief Valve is located near the bottom of the Left Riser inside wall with access gained by opening the Rear Grill.

### Cylinders

All Hydraulic Cylinders used on the Skid Loader are appropriately designed with particular strokes, diameters and hose connection provisions unique to the Skid Loader's application requirements. In addition, internal Cylinder component service and replacement requires special know-how and tools. Any one of the four Hydraulic Cylinders can be conveniently removed from the Loader and taken to the dealer for service or replacement. To remove a Cylinder, first make sure that the Lift Arms are lowered and in contact with the Loader Frame.



**Fig. 13-3: Hydraulic & Hydrostatic Systems with Overhead Guard Locked-up & Floorplates & Consoles Removed**

Then, after exercising the **MANDATORY SAFETY SHUTDOWN PROCEDURE (page 8)**, relieve pressure in the lines and disconnect the Hydraulic Hose connections. Next, remove the Rod end Anchor Pin and lastly remove the Cylinder end Anchor Pin. New Cylinder installation or repaired Cylinder replacement is in reverse sequence of removal.

**NOTE:** Tilt Cylinders can be removed with Extension Link intact; removal is unnecessary.

### Hydraulic Hoses & Tubing (Fig. 13-4)

Numerous hydraulic Hoses, Tubes and Fittings are used to interconnect the various hydraulic and hydrostatic components shown in the hydraulic system diagram. Refer to the diagram for faulty component, Hose or Fitting identification. Contact the dealer for troubleshooting and service parts references, as required.

### Electrical Components (Figs. 13-5 & 13-6)

Electrical system diagrams are provided for both model Skid Loaders which include the Ignition System, electrical components, Gauges, Indicators and Switches (both standard and accessory). The diagram provides a guide for troubleshooting and service parts references, as required.

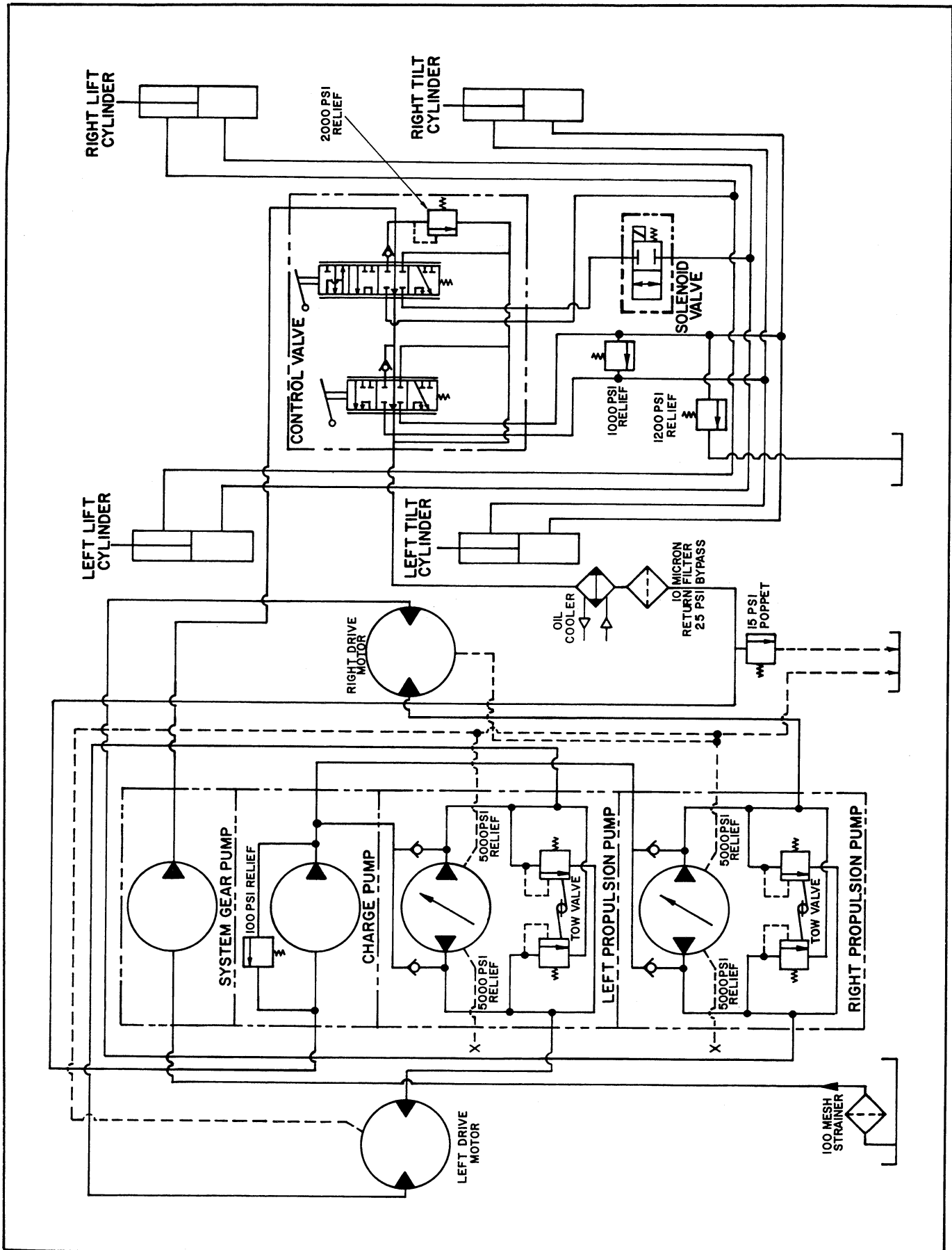


Fig. 13-4: Hydraulic System Diagram

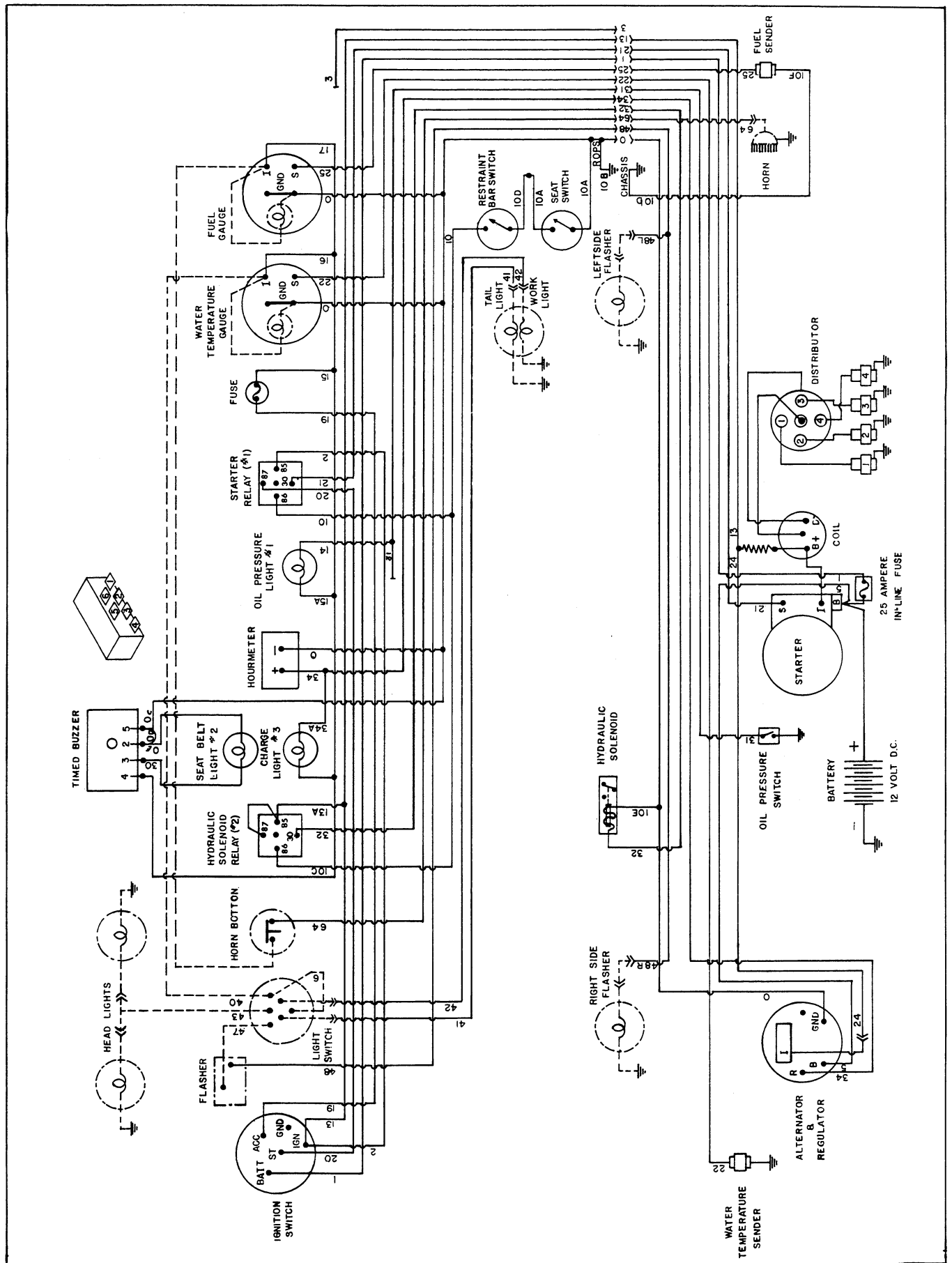


Fig. 13-5: SL4510 Electrical System Diagram

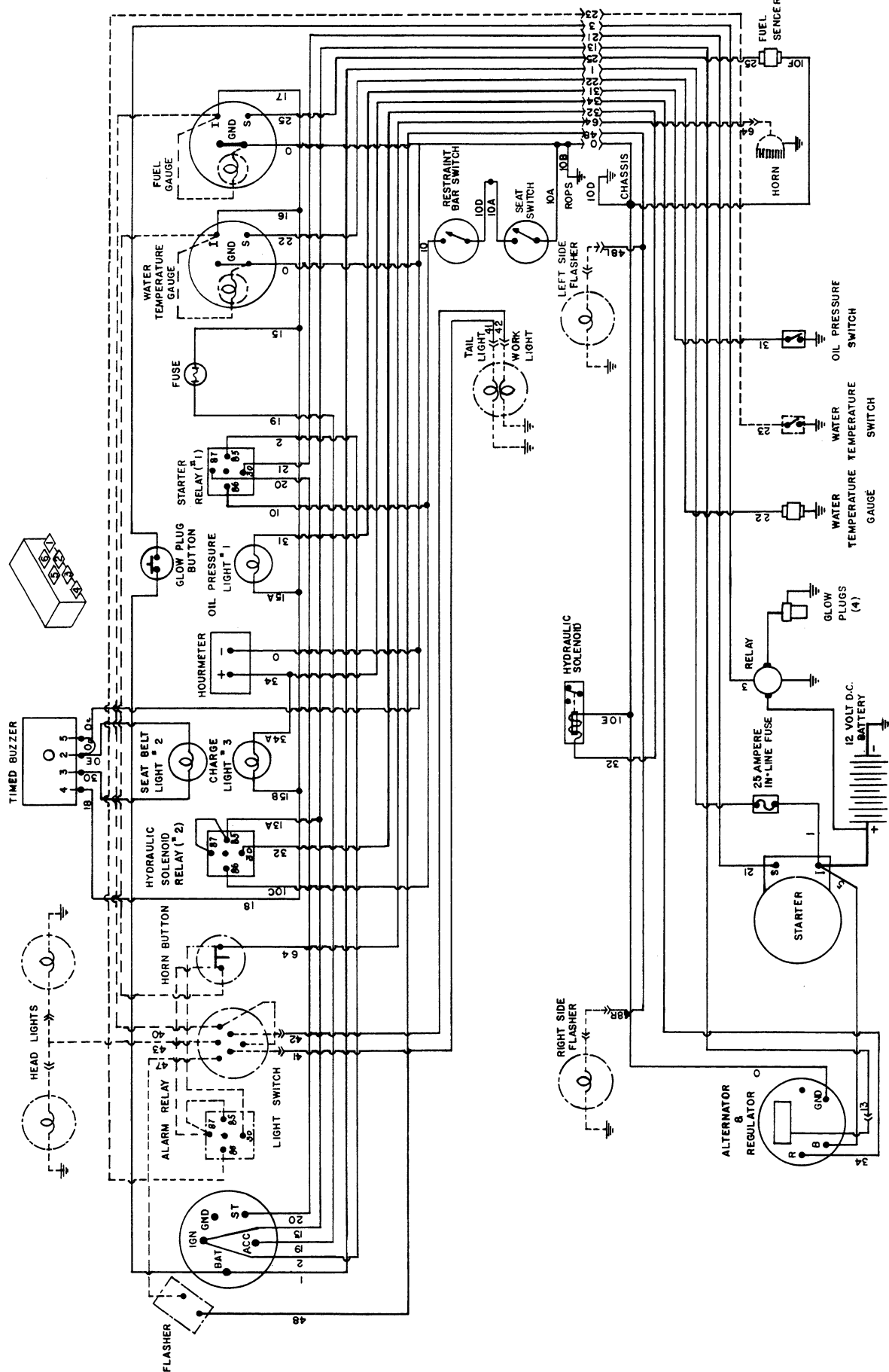


Fig. 13-6: SL4610 Electrical System Diagram

## OPERATOR SERVICES

### 10 Hour or Daily Services

All of the following services should be performed after every 10 hours of operation or at least once a day.

#### Air Cleaner Indicator (Fig. 13-7)

A condition Indicator is provided for visual monitoring of the Air Cleaner Filter Element. When the Indicator shows "red", the Filter Element requires removal and cleaning or replacement. Refer to the Air Cleaner Element subtopic under the 100 Hour Services topic for Filter Element details. Open the louvered Engine Access Cover to see the Indicator.

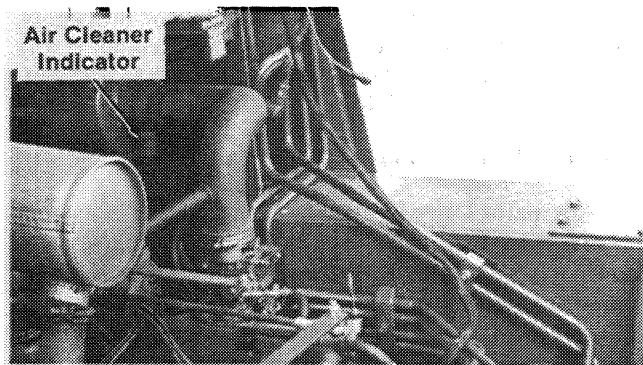


Fig. 13-7

#### Cylinder Pivots

Lubricate the Fittings on both ends of all four Hydraulic Cylinders.

#### Engine Oil Level Check (Fig. 13-8 & 13-9)

The Engine Crankcase oil level is conveniently checked with the Dipstick located on the left front corner of the Engine with access gained by opening the Engine Access Cover. Markings on the Dipstick represent both full and low (add oil) levels. Refer to the Engine Oil & Filter subtopic under the 100 Hour Services topic details on where to add oil into the Crankcase.

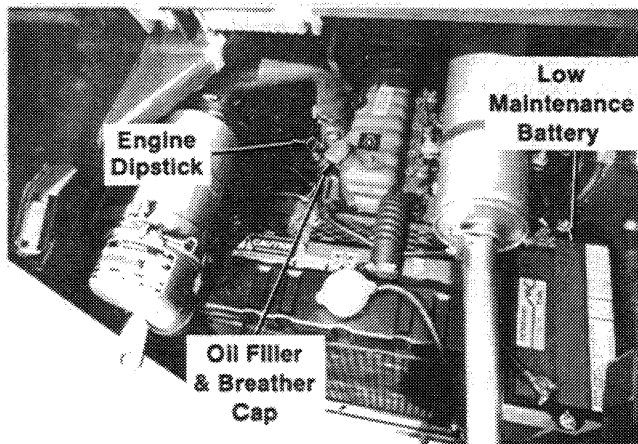


Fig. 13-8: SL4610 Diesel Engine Components

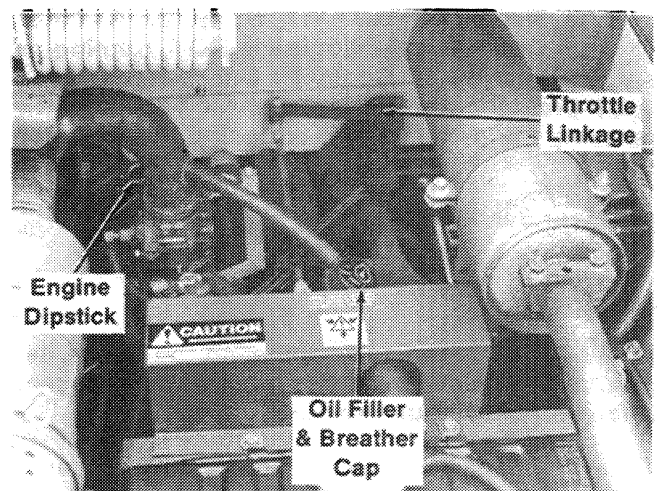


Fig. 13-9: SL4510 Gasoline Engine Components

#### Hydraulic Oil Level Check (Fig. 13-10)

A Cap with integral Dipstick is provided on the Hydraulic Reservoir which is housed in the Right Chassis Riser. The Dipstick bears a single oil level mark. Refer to the Lubrication chapter for oil recommendations and to the Hydraulic Reservoir Oil subtopic, under the 500 Hour or One Year topic, for draining and replacement information.

#### Leveling Links & Lift Arm Pivots

Lubricate both Fittings on each Leveling Link and all eight (8) Lift Arm Pivot Fittings.

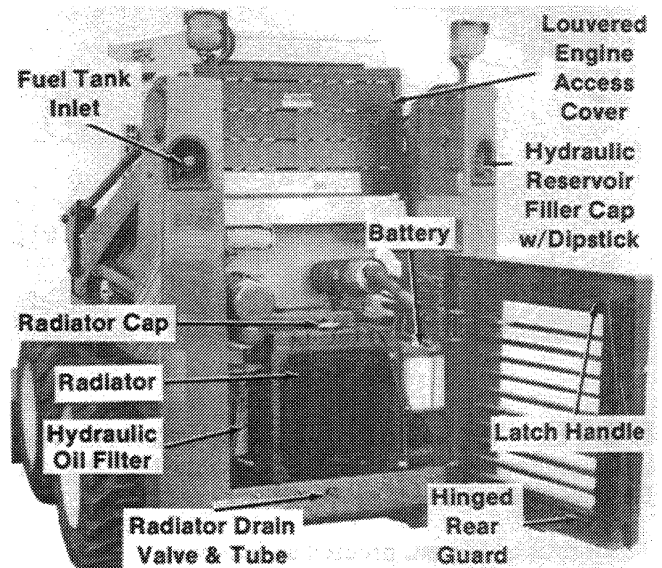


Fig. 13-10

#### Radiator Coolant Level Check (Fig. 13-10)

The Radiator Coolant level **MUST ALWAYS** be checked when the Engine is cool. Access to the Radiator Cap is obtained by unlatching and opening the Hinged Rear Guard. Maintain the Coolant level just below the neck of the Filler Hole. Refer to your Engine Manual for anti-freeze recommendations and to the Radiator Flushing & Anti-freeze Replacement subtopic, under the 500 Hour or One Year topic, for draining and Coolant replacement details.



**WARNING: DO NOT remove the Radiator Cap when the Engine is HOT, running or overheated. Coolant is extremely HOT and under pressure. Wait for the Engine to cool BEFORE relieving the pressure and removing the Radiator Cap.**

### 100 Hour Services

#### Air Cleaner Element Cleaning or Replacement (Fig. 13-11)

**NOTE:** Depending on operating conditions, the Air Cleaner Filter Element may require more frequent (than every 100 hours) service.

The Air Cleaner Element can be conveniently removed and cleaned or replaced, as necessary. To remove the Filter Element, first open the louvered Engine Access Cover and Hinged Rear Guard. Next, loosen (but do **NOT** remove) the Clamp Band Eyebolt which secures the Element Cover and remove the Cover. Then, loosen the Wing Nut which secures the Element and remove the Element from the Air Cleaner Housing. To replace the Element, reverse the removal procedure.

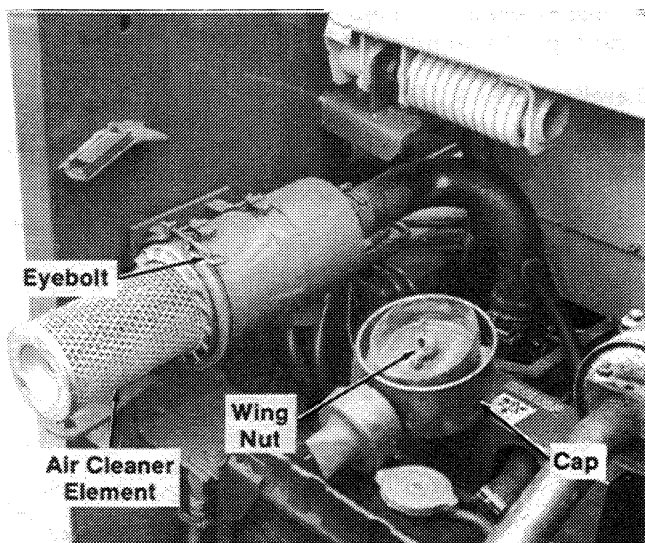


Fig. 13-11

**NOTE:** After the Air Cleaner Element has been cleaned or replaced and reinstalled, the Air Cleaner Indicator will automatically reset.

To clean the Element, proceed as follows:

1. Using clean dry air pressure of less than 100 PSIG (700 kPa) and while maintaining a reasonable distance away from the Element (to avoid caving-in the sides), direct the air up and down the pleats on the "clean air" side of the Element.

To wash an oil-laden and soot-laden Element, proceed as follows:

2. Use a Filter Cleaner solution (mixed to solution manufacturer's specifications) and soak the Element for about 15 to 30 minutes.
3. After soaking the Element, thoroughly rinse-off all residue and solution with clean water from a faucet or garden hose.
4. Using clean dry air pressure only of less than 100 PSIG (700 kPa), blow the Element dry or hang the Element up and allow it to air dry.

After the Element is cleaned and dried, use a light bulb (inserted through the Element) to inspect for thin spots, pin holes or slight ruptures; replace the Element if any damage is noted. To order a replacement Filter Element, specify GEHL part #057017.

### Alternator Belt Tension & Condition Checks

The Alternator Drive Belt can be checked by first opening the louvered Engine Access Cover and Hinged Rear Guard. Refer to the Adjustments chapter for tension adjustment procedures. To replace a Belt, loosen (but do **NOT** remove) the Alternator Bracket Bolt and Pivot Bolt and release Belt tension. Remove the worn Belt and replace it. Refer to the Adjustments chapter for retensioning details. To obtain a new Alternator Drive Belt, specify GEHL part numbers 069152 for an SL4510 or 074226 for an SL4610.

### Battery (See Fig. 13-10)

The Batteries furnished on the SL4510 and SL4610 are maintenance-free wet-cell Batteries. Access to the Battery is gained through the Hinged Rear Guard.

### Cleaning Terminals & Cable Connections

The top of the Battery **MUST** always be kept clean. Clean the Battery with a brush dipped in an alkaline solution (ammonia or baking soda and water). After the foaming has stopped, flush the top of the Battery with clean water. If the terminals and Cable connection Clamps are corroded or have a build-up, disconnect the Cables and clean the terminals and clamps with the same alkaline solution.

### Jump-starting a Discharged Battery



**CAUTION:** The only safe method of jump-starting a discharged Battery is for two people to carry out the following procedure. This is necessary in order to remove the jumper cables without leaving the Operator's Compartment with the Engine running.

If the Loader Battery becomes discharged and fails to have sufficient power to start the Loader Engine, jumper cables can be used to obtain starting assistance.



**WARNING:** DO NOT attempt to jump-start the Loader Battery if it is frozen; this may cause it to rupture or explode. Closely follow the procedures in the order listed to avoid personal injury.

**NOTE:** BE SURE that the jumper battery is also a 12 volt battery.

1. Turn the Ignition Keys of both vehicles to "off" and make sure that both vehicles are in "neutral" and **NOT** touching each other.
2. If Filler Caps are provided on the jumper vehicle, remove the Caps and make sure that the Electrolyte solution is up to the proper level. In addition, place a clean cloth over the uncapped Filler Holes to prevent the Electrolyte solution from boiling-over.



**CAUTION:** If acid contacts your skin, eyes or clothing, flush the area immediately with large amounts of water.

3. Make the positive (+) jumper cable connections between both vehicle Batteries.
4. Connect one end of the negative (—) jumper cable connection to the Skid Loader Frame or Engine Block.



**WARNING:** NEVER attempt to make the jumper cable connections directly to the Starter Solenoid of the Loader. ALWAYS make the connections to the positive (+) Loader Battery terminal and to the Loader Frame (ground). The last jumper cable connection made should ALWAYS be the negative (—) cable connection to the jumper vehicle negative (—) battery terminal.

5. Make the last jumper cable connection (the other side of the negative cable which is onto the Loader Frame) to the negative (—) terminal of the jumper vehicle battery.

**NOTE:** Twist the jumper cable clamps a couple of times on the battery terminals to insure a good electrical path for conducting current.

6. Proceed to start the Loader. If it does **NOT** start immediately, start the jumper vehicle engine to avoid excessive drain on the booster battery.

7. After the Loader is started and running smoothly, have the second person remove the jumper cables from the jumper vehicle battery and then from the Loader Battery while making sure **NOT** to short the cables together.

Allow sufficient time for the Skid Loader Alternator to build up a charge in the Battery before attempting to operate the Loader or to shut the Engine off. **BE SURE** to discard the cloths and replace the Vent Caps (if removed originally).

**NOTE:** If Loader Battery discharging becomes a recurring problem, have Battery checked for a possible dead cell(s) or troubleshoot the electrical system for possible short circuits or damaged insulation.

### Recharging a Weak Battery



**WARNING:** Do NOT attempt to recharge a frozen Battery; this may cause it to rupture or explode. Do NOT attempt to recharge the Battery in an area of sparks or near an open flame. For safest recharging methods and to protect the Battery, **BE SURE** to use a "trickle-charge" type recharger.

If the Loader Battery becomes run-down and weak, it may be desirable to recharge it with a plug-in 120 volt A.C. "trickle-type" recharger unit. Follow the operating instructions given with the unit and exercise all prescribed precautions of the manufacturer.

### Drive Chains Tension Check (See Fig. 13-3)

To gain access into the Chaincases for Drive Chain tension checks and adjustments, the Overhead Guard **MUST** be unbolted, rolled back and locked. Remove the Chaincase Covers by loosening and removing the (10) Thread-forming Screws which secure each Cover. Refer to the Adjustments chapter for additional information on actual tension adjustment procedures.

### Engine Oil & Filter Change

The Engine Crankcase oil and screw-on type Filter should be replaced after every 100 hours of operation. For access to the Crankcase Drain Plug, unbolt and remove the Bellyplate Access Cover. For access to the Breather-Filler Cap, open the Hinged Rear Guard. Refer to the Engine Manual for draining and replacement details and to the Lubrication chapter of this manual for viscosity specifications.



## Governor Belt Tension & Condition Checks (SL4510 Only)

To gain access to the Governor Belt, first open the louvered Engine Access Cover and then remove Belt Guard. Refer to the Adjustments chapter for tension adjustment procedures. To replace a Belt, loosen (but do **NOT** remove) the Bolt which secures the Idler Sheave and release Belt tension. Remove the old Belt and replace it. Refer to the Adjustments chapter for retensioning details. To obtain a new Governor Belt, specify GEHL part number 064095. **BE SURE** to replace Belt Guard after Service routine is completed.

## Tire Pressure Check

Skid Loaders can be equipped with either 7.00 x 15 6-ply Tires or 10.00 x 16.5 6-ply Flotation Tires. The recommended inflation pressures for the two types of Tires are 55 PSIG (385 kPa) for the Regular Tires and 45 PSIG (315 kPa) for the Flotation Tires. Proper Tire pressure should be equally maintained for all four Tires to enhance operating stability and extend Tire life.

When Skid Loader Tires are replaced, **BE SURE** that there is **NOT** too much tread difference between Tires on the same sides of the Loader. Always replace Tires with the same size furnished as original equipment; replacement Tires **MUST** be purchased locally.

## Tightening Wheel Lug Nuts

The Lug Nuts, which secure the Wheels to the Skid Loader Axle Spindles, have a 9/16" National Fine thread requiring 90 ft-lb (124.5 N-m) of torque to properly tighten them.

## 200 Hour or 6 month Services

### SL4510 Ignition System Tune-up

Four specific routine services for the SL4510 Ignition System are the Breaker Point Gap, the Distributor Cam, the Timing and the Spark Plugs. Details and settings are listed on the Operator Service Guide and covered in detail in the Engine Manual. **BE SURE** that the Point Gap is at 0.025, the Cam is oiled, the Engine Timing is 10° -12° BTDC, and the Spark Plug gap is 0.032.

### Cleaning Engine Breather (See Figs. 13-8 & 13-9)

The Breather Cap on either model Loader Engine is a wire mesh filled assembly which can become plugged by dirt and moisture contamination. Use a Breather Cap solvent to clean out the Cap and **BE SURE** the assembly is completely dried-out before replacing it to help prevent solvent contamination in the crankcase oil.

### Hand Brake Adjustment (Figs. 13-12 & 13-13)

**NOTE:** Normal Hand Brake adjustment details are covered in the Adjustments chapter.

The Hand Brake Handle itself has an adjustment built into it which should be used, as necessary, for maintaining the original (factory set) tension of the Disc Brake

assemblies. Through the course of normal operation and Brake Handle readjustments, the Handle will be turned to the limit of its adjustment. At this time, the Handle adjustment should be returned to the opposite limit of its rotation and the Adjustment Screw on each Disc Brake assembly should be rotated to relocate the Disc Pads closer to the Discs. Then, the Handle can once again be used to make appropriate operating readjustments. After the Adjustment Screw on each Disc assembly has been readjusted two times, the Disc assemblies will require removal from the Loader and the Disc Pads **MUST** be replaced. Access to the Adjustment Screws on both Disc assemblies is gained by unbolting and removing the Access Covers between the wheels on each side of the Loader. To enable removing the Disc Brake assemblies, the Chaincase Covers **MUST** be removed and the Chaincase oil **MUST** be drained.

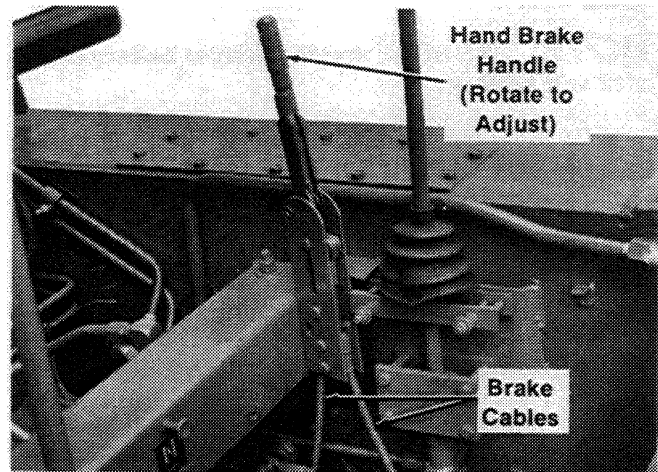


Fig. 13-12

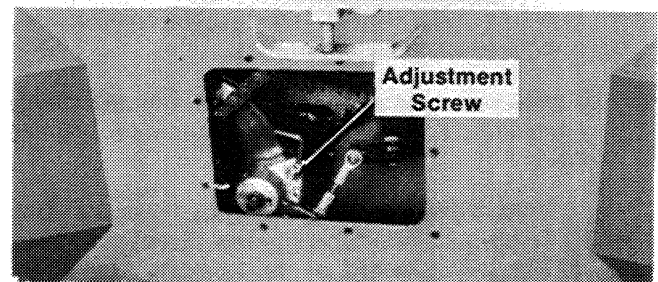


Fig. 13-13: Access Cover Removed

### Hydraulic Oil Filter Element Replacement (See Fig. 13-10)

After every 200 hours of operation or at least after every 6 months of Skid Loader operation, the Hydraulic Oil Filter Element should be removed and a new Element should be installed. Access to the Element is gained by first unlatching and opening the Hinged Rear Guard and then by loosening and removing the Element. **BE SURE** to allow the Hydraulic Oil to warm-up sufficiently before removing and replacing the Element. Drain the oil out to a level which is at least below the point where the Filter attaches to the Reservoir.

**NOTE:** For replacement screw-on type Hydraulic Oil Filter Element, specify GEHL part number 074830.

### Linkage Ball Joints

Ball Joint style pivoting connectors are used on both T-bar Control linkage connections and the Throttle and Accelerator Footpedal linkage connections. Access to the Ball Joints is gained by removing the Rear Floor-plate and both T-bar Consoles. All Ball Joints should be lubricated with a couple of drops of oil to help maintain freedom of movement. At the same time the Ball Joints are lubricated, all locking Nuts should be tightened.

### Radiator & Oil Cooler (See Fig. 13-10)

The Radiator and the Oil Cooler are mounted between the Engine and the Hinged Rear Guard. When properly functioning, the air is blown through the openings between the coils and fins by the Engine Fan. Over a period of normal operation, dust and debris will build-up on the inlet side of the Radiator and Oil Cooler and restrict air flow through the fins. To reduce or remove this restriction, use a garden hose and direct the water through the Radiator fins from the rear of the Radiator.

**NOTE:** An Inspection Hole is provided for seeing into the area between the Oil Cooler and Radiator. **BE SURE** to replace Inspection Hole Cover **BEFORE** resuming operation.

### 500 Hour or 1 year Services

#### Chaincase Oil Replacement

After every 500 hours of operation or at least once a year, the oil in both Chaincases should be drained and new oil should be installed. A convenient method of draining the oil is to first raise and properly block the Loader up off its Tires (using the procedure outlined in the beginning of the Adjustments chapter). Then, remove the Drain Plug from the Chaincase Housing recess behind each Wheel to allow the oil to drain out. Once the oil is drained-out, replace the Plugs and install 1 gallon (3.8 liters) of fresh 10W40 oil for each Chaincase Housing through the Chaincase Access Cover openings.

#### R retorquing Engine Mounting Hardware

All Engine mounting hardware should be kept properly tightened at all times. Both those Bolts which secure the Engine Mounting Brackets to the Engine and those which secure the Engine Mounting Brackets to the Loader Frame should be checked and retorqued, if necessary.

#### Fuel Filter Replacement

Both model Skid Loaders are equipped with inline disposable Fuel Filters. Refer to appropriate information in your Engine Manual for Filter Element ordering and replacement information.

### Hydraulic Reservoir Oil Replacement

The Hydraulic System oil is contained in the Reservoir (and the Hoses of the System). The Reservoir is built into the Right Chassis Riser and a Drain Plug is provided in the bottom of the Riser for draining the oil. Refer to the Lubrication chapter for oil types and viscosity information. **BE SURE** to replace and tightly secure the Drain Plug before installing new oil through the Dipstick Hole at the top of the Reservoir.

### Hydraulic Tank Strainer Cleaning (See Fig. 13-10)

The Hydraulic Oil Strainer is located inside the Hydraulic Reservoir. The Oil **MUST** be drained out of the Reservoir before attempting to service the Strainer. Access for Strainer removal is gained by unlatching and opening the hinged Rear Guard. To remove the Strainer, detach the Access Cover from the Right Riser. Then, unscrew and remove the Strainer. Use a Filter Cleaner solution (mixed to manufacturer's specifications) and soak the Element for about 15 to 30 minutes. After the Element is soaked, thoroughly rinse-off all residue and solution with clean water from a faucet or garden hose. Then, use clean dry air pressure to blow the Element dry. Once the Element is thoroughly dry, it can be replaced in reverse order of disassembly. To order a replacement Filter Element, specify GEHL part number 055013. **BE SURE** also to clean the Band Magnet on the Strainer.

### PCV Valve Replacement (SL4510 Only)

The Positive Crankcase Ventilation (PCV) Valve on the SL4510 Gasoline Engine should be removed and replaced after 500 hours of Engine operation. Refer to the Engine Operator's Manual for additional details.

### Radiator Flushing & Anti-freeze Replacement (See Fig. 13-10)

The Radiator is accessible when the hinged Rear Guard is unlatched and swung open. A Drain Tube & Valve is provided in the bottom of the Radiator to conveniently drain the Radiator. Using a garden hose, direct water through the Radiator Cap opening to flush out the coils. After the Radiator is flushed, close the Drain Valve and replenish the anti-freeze. Refer to the Engine manual for coolant recommendations.

### Valve Tappet Adjustment

As part of normal Engine tune-up procedures, the Valve Tappets should be readjusted following details in your Engine manual.

# CHAPTER 14

## MAINTENANCE LOG

[illegible]

COMPONENT & SERVICE REQUIRED	PROCEDURE AND/OR CHAPTER TOPIC REFERENCE (Check Pg. # in Index)
<b>Service Every 100 Hours</b>	
Clean or replace Air Cleaner Element  Check Alternator Belt condition and readjust Belt tension On SL4510 model only, check Governor Belt condition and readjust Belt tension  Check and readjust Drive Chains tension  Drain Engine Crankcase oil, replace filter and install new oil  Check Tire pressure and retighten Wheel Lug Bolts  Inspect space between Oil Cooler and Radiator thru Inspection Hole provided.	Refer to <b>Service</b> chapter  Refer to <b>Adjustments</b> chapter to Drive Belts topic  Refer to <b>Adjustments</b> chapter to Drive Belts topic  Refer to <b>Adjustments</b> chapter to Drive Chains topic  Refer to <b>Service</b> and <b>Lubrication</b> chapters  Refer to <b>Service</b> chapter for Tire pressures and Lug Bolts torque  Flush-out if buildup exists and replace Inspection Hole plug.
<b>Record Hourmeter Reading After Servicing</b>	
<b>Service Every 200 Hours or 6 Months</b>	
On SL4510 model only, check Breaker Point Gap, Oil Distributor Cam, check and readjust Engine timing, and regap or replace Spark Plugs  Clean Engine Breather Cap  Readjust Hand Brake  Replace Hydraulic Reservoir Filter Element  Oil all Linkage Ball Joints and tighten Locking Nuts  Clean and backflush Radiator Fins	Refer to <b>Service</b> chapter or separate Engine manual   Refer to <b>Service</b> chapter  Refer to <b>Adjustments</b> chapter  Refer to <b>Service</b> chapter  Refer to <b>Service</b> chapter  Refer to <b>Service</b> chapter
<b>Record Hourmeter Reading After Servicing</b>	

COMPONENT & SERVICE REQUIRED							PROCEDURE AND/OR CHAPTER TOPIC REFERENCE (Check Pg. # In Index)						
Service Every 500 Hours or 1 Year													
Grease all Axle Bearing Fittings							Use good quality Lithium base Grease and remove Wheels for access						
Drain and replace oil in both Chaincases							Refer to <b>Service</b> chapter						
Retorque Engine Mounting hardware							Refer to <b>Service</b> chapter						
Replace Fuel Line Filter Element							Refer to separate Engine manual						
Drain and replace Hydraulic Reservoir Oil and remove and clean Tank Strainer							Refer to <b>Service</b> chapter						
On SL4510 model only, replace PCV Valve							Refer to separate Engine manual						
Flush Radiator and replace anti-freeze							Refer to <b>Service</b> chapter						
Adjust Valve Tappets							Refer to separate Engine manual						
Record Hourmeter Reading After Servicing													

# INDEX

	Page		Page
<b>A</b>		<b>L</b>	
Adjustments .....	23-28	Lubrication .....	29-31
Loader Raising Procedure .....	23	General Information .....	29
Control T-bars .....	24-26	Oils .....	29
Lift/Tilt T-bar .....	24	Greasing .....	30
Propulsion T-bar .....	24-26	Grease Fitting Locations .....	30-31
Control Arm Cams .....	24	<b>M</b>	
Detent .....	24	Maintenance Log .....	58-60
Linkage Rods .....	26	<b>O</b>	
Engines .....	26	Operation .....	15-22
Belts - Alternator & Generator .....	26	General Information .....	15-16
Alternator .....	26	Stopping Loader .....	15
Governor .....	26	Before Starting Engine .....	15
Drive Chains .....	26	Starting Engine .....	15
Hand Brake .....	26-27	Stopping Loader Movement .....	15-16
Hydro-lock Levers .....	27	First Time Practice Running .....	16
Throttle & Accelerator .....	27	Hand Brake .....	16
<b>C</b>		Mechanical Lift Cylinder Lock .....	16-17
Check Lists .....	5-7	Lock Engagement .....	17
Controls & Safety Equipment .....	10-14	Lock Disengagement .....	17
Choke .....	10	Material Densities .....	17-18
Electrical Seat-actuated Lift Cylinder Lock .....	10	Working with Loader .....	18-20
Electrical Seat-actuated Starter Disconnect .....	10	Digging with and Loading a Bucket .....	18-19
Front Hydraulics (Optional) .....	10	Dumping the Bucket or Fork .....	19
Guards & Shields .....	10-11	Onto a Pile .....	19
Bolt-on Shield & Covers .....	11	Into a Box .....	19
Hinged Guards .....	11	Over a Solid Embankment .....	19
Hand Brake .....	12	Scraping with a Bucket .....	20
Hydro-lock Levers .....	11-12	Leveling with a Bucket .....	20
Mechanical Lift Cylinder Lock .....	12	Changing Attachments .....	20-21
Overhead Guard & Lock Mechanism .....	12	Auxiliary Front Hydraulics (Optional) .....	21
Operator Secondary Restraint Bar .....	12-13	Radiator Hose Heater .....	22
Overhead Instrument & Control Panel .....	13-14	Towing & Highway Travel .....	22
Battery Charge and Oil Pressure Warning		Optional Features & Accessories .....	37-39
Lights .....	13	Attachments & Accessories .....	37-38
Cold Start Button (SL4610 model Only) .....	13	Buckets .....	37
Control Panel Fuse .....	13	Dirt & Rock Teeth Kit .....	37
Fuel Level and Water Temperature Indicator		Grapple Fork .....	37
Gauges .....	13	Manure Fork .....	37
Horn Button (Accessory) .....	13	Pallet Fork .....	38
Hourmeter .....	13	Auxiliary Hydraulics .....	38
Ignition Keyswitch .....	13	Drawbar Kit .....	38
Light Switch (Accessory) .....	13	Horn Kit .....	38-39
Seat Belt Warning Light & Buzzer .....	14	Hydraulic Oil Heater Kit .....	39
Seat Positioning .....	14	Sound-Deadening Packages .....	39
Self-leveling .....	14	Work & Warning Lights .....	39
In-line Circuit Fuse .....	14	<b>S</b>	
T-bars .....	14	Safety .....	8-9
Propulsion Control T-bar .....	14	Service .....	48-57
Lift/Tilt Control T-bar .....	14	General Information .....	48
Throttle & Accelerator Pedal .....	14	Dealer Services .....	48-49
<b>D</b>		Hydrostatic Pumps & Motors .....	48
Decal Locations .....	39-41	Hydraulic System Pump .....	48-49
<b>I</b>		Control Valves .....	49
International Symbols Explanation .....	28	Relief Valve for Self-leveling .....	49
Introduction .....	2	Cylinders .....	49

# INDEX (con't.)

	<b>Page</b>
Hydraulic Hoses & Tubing .....	49
Electrical Components .....	49
Hydraulic System Diagram .....	50
Electrical System Diagrams .....	51-52
Operator Services .....	53-57
10 Hour or Daily Services .....	53-54
Air Cleaner Indicator .....	53
Cylinder Pivots .....	53
Engine Oil Level Check .....	53
Hydraulic Oil Level Check .....	53
Leveling Links & Lift Arm Pivots .....	53
Radiator Coolant Level Check .....	53-54
100 Hour Services .....	54-56
Air Cleaner Element Cleaning or Replacement .....	54
Alternator Belt Tension & Condition Checks .....	54
Battery .....	54-55
Cleaning Terminals & Cable Connections .....	54
Jump-starting a Discharged Battery .....	55
Recharging a Weak Battery .....	55
Drive Chains Tension Check .....	55
Engine Oil & Filter Change .....	55
Governor Belt Tension & Condition Check .....	56
Tire Pressure Check .....	56
Tightening Wheel Lug Bolts .....	56
200 Hour or 6 Month Services .....	56-57
SL4510 Ignition System Tune-up .....	56
Cleaning Engine Breather .....	56
Hand Brake Adjustment .....	56
Hydraulic Oil Filter Element Replacement .....	56

	<b>Page</b>
Linkage Ball Joints .....	57
Radiator & Oil Cooler .....	57
500 Hour or 1 Year Services .....	57
Chaincase Oil Replacement .....	57
Retorquing Engine Mounting Hardware .....	57
Fuel Filter Replacement .....	57
Hydraulic Reservoir Oil Replacement .....	57
Hydraulic Tank Strainer Cleaning .....	57
PCV Valve Replacement (SL4510 Only) .....	57
Radiator Flushing & Anti-freeze Replacement .....	57
Valve Tappet Adjustment .....	57
Set-up & Assembly .....	32-36
Auxiliary Front Hydraulics Kit (SL4510 Only - Field Installation) .....	32-34
Work & Warning Light Kit (Field Installation) .....	34-36
Specifications .....	3-4
Standard Hardware Torque Specifications .....	Inside Back Cover
<b>T</b>	
Technical Publications Order Form .....	63-64
Troubleshooting .....	42-47
Electrical System .....	42
Engine .....	42-43
Hydraulic Lift and Bucket .....	43
Hydrostatic Drive .....	44-47
<b>W</b>	
Warranty .....	Inside Front Cover



# TECHNICAL PUBLICATION ORDER FORM

Machine Model Number & Description	Manual Description	Quantity* Desired	Form Number	Replaces
<b>4510/4610 Skid Loader</b>	<b>Operator's</b>			
<b>4510/4610 Skid Loader</b>	<b>Service Parts</b>			
<b>3010/4010 Backhoe</b>	<b>Operator's</b>			
<b>Customer Complete, Address, Tear-out &amp; Mail-in**</b>			<b>Office Records Only</b>	

(Remove At Perforation & Mail-in)

\* Indicate number of manuals desired.

\*\* Multiply the quantity desired by \$3.50 (U.S. Funds) and enclose check or money order for that amount to expedite processing and shipment.

\_\_\_\_\_  
Amount Enclosed

Make check or money order payable to:  
 Gehl Company  
 143 Water Street  
 West Bend, WI 53095

\_\_\_\_\_  
Name or Establishment Title

\_\_\_\_\_  
Street Address, Rural Route or Post Office Box Number

\_\_\_\_\_  
City, State and Zip Code

**INTENTIONALLY BLANK**  
**(To Be Removed As Technical Publication**  
**Order Form)**

## TORQUE SPECIFICATIONS FOR STANDARD MACHINE HARDWARE

All Torque Values are in Ft-Lbs except when marked with an \* which are In-Lbs.  
(Multiply In-Lb value\* by 0.113 or Ft-Lb value by 1.355 to obtain metric Nm value.)

Bolt Size	Grade 2		Grade 5		Grade 8	
	Dry	Lub.	Dry	Lub.	Dry	Lub.
8-32	19*	14*	30*	22*	41*	31*
8-36	20*	15*	31*	23*	43*	32*
10-24	27*	21*	43*	32*	60*	45*
10-32	31*	23*	49*	36*	68*	51*
1/4-20	66*	50*	9	75*	12	9
1/4-28	76*	56*	10	86*	14	10
5/16-18	11	9	17	13	25	18
5/16-24	12	9	19	14	25	20
3/8-16	20	15	30	23	45	35
3/8-24	23	17	35	25	50	35
7/16-14	32	24	50	35	70	55
7/16-20	36	27	55	40	80	60
1/2-13	50	35	75	55	110	80
1/2-20	55	40	90	65	120	90
9/16-12	70	55	110	80	150	110
9/16-18	80	60	120	90	170	130
5/8-11	100	75	150	110	220	170
5/8-18	110	85	180	130	240	180
3/4-10	175	130	260	200	380	280
3/4-16	200	150	300	220	420	320
7/8-9	170	125	430	320	600	460
7/8-14	180	140	470	360	660	500
1-8	250	190	640	480	900	680
1-12	270	210	710	530	1000	740

**NOTE:** These torque values are to be used for all **GEHL** hardware excluding: Locknuts, Self-tapping Screws, Thread Forming Screws and Sheet Metal Screws. Unless otherwise specified, all torque values must meet this specification.

### BOLT GRADE IDENTIFICATIONS



Grade 2



Grade 5



Grade 8

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# GEHL®

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GEHL COMPANY WEST BEND, WISCONSIN 53095 U.S.A.

**California Proposition 65 Warning**

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer and birth defects or other reproductive harm.

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling battery.